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INNOVATIVE PRACTICES TO CREATE JOBS AND REDUCE POLLUTION

HEARING

BEFORE THE

SUBCOMMITTEE ON GREEN JOBS
AND THE NEW ECONOMY

OF THE

COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS UNITED STATES SENATE

ONE HUNDRED TWELFTH CONGRESS

FIRST SESSION

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C O N T E N T S

INNOVATIVE PRACTICES TO CREATE JOBS AND REDUCE POLLUTION

THURSDAY, October 13, 2011

U.S. SENATE,
COMMITTEE ON ENVIRONMENT AND PUBLIC WORKS,
SUBCOMMITTEE ON GREEN JOBS AND THE NEW ECONOMY,
Washington, DC.

The subcommittee met, pursuant to notice, at 10 a.m. in room 406, Dirksen Senate Office Building, Hon. Bernard Sanders chairman of the subcommittee) presiding.

Present: Senators Sanders, Boozman, Boxer, Inhofe, Sessions, Whitehouse, and Merkley.

OPENING STATEMENT OF HON. BERNARD SANDERS, U.S. SENATOR FROM THE STATE OF VERMONT

Senator SANDERS. Good morning and welcome to an important hearing sponsored by the Green Jobs Subcommittee. We will begin with opening remarks from Members of the Senate on the Committee, and then we will go to testimony from panelists, and we very much thank our distinguished panelists for being here.

The issue that we are discussing today is not exactly a sexy issue. It is not going to appear on the front pages of newspapers all over this Country, but in my view it is a very, very important issue. And it is an important issue because it addresses at least three major concerns that we have in our Country.

No. 1, obviously all of us are concerned about the recession and the significant amount of unemployment that we have. This bill creates jobs.

No. 2, many of us are concerned about the kinds of expenses and costs that businesses, homeowners accrue. This concept will help make small businesses run their enterprises more cost-effectively. It will help homeowners save substantial sums of money on their electricity and their fuel bills, and do the same for municipalities.

So to the degree that we want to save consumers money, make our businesses more competitive, this bill does that as well. And for those of us who are concerned about the crisis of global warming and cutting greenhouse gas emissions, this concept is also very important because it will do just that.

On-bill financing, which is the subject of discussion today, refers to a program run by a utility where customers can get a loan to pay for energy efficiency or sustainable energy at their home or small business and use the energy savings from those measures to pay back the loan over time on their utility bill.

It is a simple and straightforward concept and it presents a huge opportunity to cut energy bills, and we will hear some testimony as to how that has occurred; an opportunity to create jobs, we will hear testimony about that; and also to slash greenhouse gas emissions and other pollutants.

Just consider for a moment the potential for energy savings. The National Small Business Association, one of our witnesses here today, issued a report finding that if small businesses were able to improve energy efficiency by 25 percent, not an unrealistic goal, we could cut greenhouse gas emissions equivalent to 51 coal-fired powerplants and save the average small business nearly $5,000 per year on their energy bills. For a small business, $5,000 is not an insignificant sum of money.

The White House Middle Class Task Force estimates that existing technologies can reduce home energy consumption 40 percent on average, and I can tell you in Vermont, we do see that, which would yield $21 billion annually in energy bill savings.

Both the National Small Business Association and the White House Middle Class Task Force identified the need for up-front funds to pay for these cost-effective energy projects as a major barrier. In other words, all over this Country, small businesses, public institutions, homeowners want to make the investment, but they don't have the $5,000, $10,000, $15,000 that they need to save money in the future. That is the challenge we are dealing with today.

If you are a large business or a State or local government, you can get access to what is called energy performance contracting. That is where a private contractor provides you with up-front money for cost-effective energy upgrades and you pay back the loan through your energy bill savings. And I think many of us are familiar with one of the major examples of that, and that took place at the Empire State Building. We have heard a lot of discussion about that.

Johnson Controls, a major corporation, did an energy performance retrofit that will save 38 percent on energy consumption, $4.4 million annually in energy costs at the Empire State Building, meaning the payback for the project is 3 years. That is just an extraordinary investment, I think we can all agree on that.

These types of saving opportunities exist for small businesses and families, too, but at this moment in many cases small businesses and families simply cannot get the kind of financing that an entity like the Empire State Building is able to get.

So that is where innovative programs like on-bill financing come in. On-bill finance lets small businesses and homeowners access funds to make energy improvements pay for themselves over time. These programs are available to at least some customers in 17 States across the Country. And today we will hear from National Grid, which operates a successful on-bill finance program in the northeast.

In Vermont, we have led the Nation in energy efficiency, although I know my colleague from California occasionally disagrees with me on that. And we have actually cut electric consumption by 14 percent over the last 10 years compared with projected demand.

I am pleased that our Governor's new energy plan endorses on-bill financing as a way to help Vermonters access the funds to make our homes and businesses more efficient and move us toward more solar and geothermal and sustainable energy. What we know in Vermont we know nationwide. We can do more. We surely can. And on-bill finance programs can help.

We know, too, that according to research from the University of Massachusetts and the University of California-Berkeley, investments in energy efficiency and sustainable energy create more jobs than investments in fossil fuels. So we are talking about a real job-creating machine here.

And that is why I am announcing today that my office will soon be introducing legislation to support utilities that want to go forward on on-bill financing for their customers. We have 17 States that are doing it. I want to see 50 States in this Country doing it.

When you have a program that cuts energy bills, makes small businesses more competitive, creates jobs and slashes greenhouse gas emissions, this is a win-win-win situation and Congress should be supportive of those efforts.

I look forward to working with all of my colleagues on this legislation and I thank all of our witnesses for being here today for this important discussion.

Senator SANDERS. I now want to introduce Senator Boozman for his remarks.

Senator.

OPENING STATEMENT OF HON. JOHN BOOZMAN, U.S. SENATOR FROM THE STATE OF ARKANSAS

Senator BOOZMAN. Thank you, Mr. Chairman. And I am glad that we can hold this hearing and really do look forward to the testimony. I appreciate all of you all being here. I have had the opportunity to read your testimony and it really is very helpful.

With high unemployment and economic hardship hitting many families, in fact I think almost all families, I believe today's hearing is very timely and it will help us answer a number of questions, such as: At what point do regulations become counterproductive by driving blue collar jobs, manufacturing jobs, energy sector jobs overseas to countries with lower standards and more pollution? Are we properly analyzing regulations to make sure we count all the costs and the benefits? And how can we best support market-driven incentives like on-bill financing to increase energy efficiency and renewable energy?

I think today's witnesses will give helpful answers to some of these questions from their perspectives. Let me also say again good public policy will lead to net job creation, while at the same time promoting conservation, clean air and clean water.

Job creation should include, but not be limited, to green jobs. Bad policies may create jobs, but they will lead to greater losses in other areas. We must consider which policies actually work and which policies have severe unintended negative consequences.

I have said before, Congress should not rubber-stamp every policy that is labeled green. There are a lot of steps we can take to make sure our companies are successful. One of our witnesses that we are happy to have, for example, is in the steel industry. His

company, Nucor, has approximately 1,500 employees in Arkansas. They have the capacity to recycle 6 million tons of steel annually in our State. The U.S. steel industry has significantly reduced its energy intensity and its emissions over the last 20 years, and our domestic industry is the cleanest steel industry on the planet in terms of energy intensity and emissions.

We need to make sure industries like this can afford to comply with new regulations that could drive up the cost of energy and give their overseas competitors an unfair advantage.

Again, Mr. Chairman, thank you very much for holding this very timely hearing.

Senator SANDERS. Thank you very much, Senator Boozman.

Senator Boxer is the Chair of the full Environment and Public Works Committee. We are pleased that she is here with us today.

Senator Boxer.

OPENING STATEMENT OF HON. BARBARA BOXER, U.S. SENATOR FROM THE STATE OF CALIFORNIA

Senator BOXER. Senator Sanders, thank you so much.

The title of this hearing is Innovative Practices to Create Jobs and Reduce Pollution. And I think it is very important because as we expand our economy, we want to make sure we continue to make progress on clean air. I have often said if you can't breathe, you can't work. And that is a fact. So I thank you for this.

This hearing is focusing on policies to expand the use of energy efficiency, such a win-win, and renewable energy technologies, which includes financing of these technologies by utilities companies that the customers pay back over time on their bill.

What we have happening in California now, Senators, I think it is interesting, is the private sector has moved in and they do the same thing that your utilities are doing, the private sector comes in and they put the solar roof on and then the customer saves the money and that pays back the company for the capital investment. It is working very well, creating a lot of jobs and doing what you want to do, Mr. Chairman. You are creating jobs and reducing pollution at the same time.

So innovative financing can provide incentives to customers to improve energy efficiency of their homes and businesses and increasing the use of renewables. Expanding the use of these technologies will put people to work, including construction workers who retrofit structures with insulation and weatherization, workers who install and maintain heating and air conditioning systems, and people who manufacture energy efficient products.

And since we have a very successful businessman here, when I visited my businesses in Silicon Valley and they are high-growth. They use a lot of energy, they have saved so much money from their costs because they have installed a lot of the latest energy efficiency technologies. They have moved to all the new innovations that are making us, frankly, a leader in this area.

By the way, we have $48 billion a year of exports, clean-tech exports. It supports, by the way, 1.7 million jobs, which is very, very important.

So again, I think this focus of yours today is so important as we work for jobs, jobs, jobs. And also work to protect the health of the American people.

We know that since the Clean Air Act's inception in 1970, the U.S. gross domestic product has risen by 207 percent. Now, that is the best in the developing world. So not only is clean tech a critical job creator, it provides such important health benefits that, according to a study that was demanded by Congress, we find that if we continue to turn back efforts to roll back Clean Air Act protections and keep on moving toward those protections, by 2020 the Clean Air Act is projected to prevent, listen to this, 230,000 premature deaths; 2.4 million asthma attacks; 200,000 heart attacks; 120,000 emergency room visits; 17 million lost workdays; and 5.4 million lost school days.

So when we talk about the importance of jobs, let's remember that fair regulation that makes sense means that we protect the health of the people. We keep them productive. We don't have people dying of heart attacks and missing school and work. This is a very important benefit that we should keep in mind and why this hearing is so critical. Because what we are talking about in this hearing is making sure we have expansion of clean energy. And it is just a win-win for everybody.

So I again say to Senator Sanders, I am so pleased that you brought us together. I think what you are trying to do is put people to work. You are going to keep American families healthy and we are going to save a lot of money for the average family that gets a chance to take advantage of the kinds of weatherizaton programs and alternative energy programs that you are seeing in your State and I am seeing in my State.

And right as we speak, my staff is checking to see who has the best record in their State for energy efficiency, and we will get back to you on that. We will leave the record open, with your permission.

Is that all right?

Senator SANDERS. Without objection.

Senator BOXER. Well, thank you.

[Laughter.]

Senator SANDERS. Senator Jim Inhofe is the Ranking Member of the full Committee.

Jim, thanks for being here.

OPENING STATEMENT OF HON. JAMES INHOFE, U.S. SENATOR FROM THE STATE OF OKLAHOMA

Senator INHOFE. Thank you, Mr. Chairman and Senator Boozman, for having the hearing today. We have some familiar witnesses here, Mr. Rowlan and Dr. Smith, and Phil Schoen.

Mr. Chairman, you may not be aware of this, I have to interrupt you there. In 2003, Mr. Schoen presented me with an award for my work in promoting the use of geothermal heat. Oklahoma is a leader in the geothermal area.

Senator SANDERS. Jim, we invited him notwithstanding that.

[Laughter.]

Senator INHOFE. Well, I know that and I appreciate that. I will remember that a year from now, too. That is good.

[Laughter.]

Senator INHOFE. In fact, in 2007, I worked with then-Senator Clinton to pass the Federal Buildings, along with Senator Boxer, Energy Conservation Act, a bill that encourages use of geothermal. So it is something that is there. It is good and we are the leaders out in Oklahoma.

With the low financing rates dominating the marketplace today, on-bill financing is a good tool to encourage investment in energy efficiency. Although I don't see the Federal role in expanding capital access, I welcome discussions on the topic. More pressing at this time, however, is the havoc the EPA is wreaking upon our manufacturing sector.

Whether we are looking at Solyndra, the debacle with that, or the EPA train wreck, it is clear that the EPA is waging war on affordable energy that is undermining economic growth. Ironically, the President himself has now publicly acknowledged the connection when he stopped the agency from tightening the national ambient air quality standard. Prose on his statement could not have been clearer. EPA rules create regulatory burdens and uncertainty that stifles job growth.

Yet, the EPA continues to push regulations that harm the economy. The cross-State air pollution rule, the so-called utility MACT rules, they are primary examples of that. These rules are specifically designed to force companies to abandon affordable energy resources like coal.

Remember, President Obama wants electricity rates to skyrocket as he told the San Francisco Chronicle recently, "If somebody wants to build a coal-fired plant, they can, it is just that it will bankrupt them.'

What this President fails to realize is that affordable, reliable energy is the lifeblood of a healthy economy and the foundation of our global competitiveness. The Maguire Energy Institute points out in a recent report that even modest electricity price increases for energy-intensive American manufacturers depress economic growth and make firms less competitive vis-a-vis China, worsening our trade deficit in the process.

This is ominous, given that NERA is projecting that the cumulative effect of EPA's rules on electric utilities may result in electricity costs increasing as much as 19 percent in America's manufacturing heartland. In fact, NERA projects these costs could translate into a loss of 1.6 million jobs by the end of the decade, even though the so-called green jobs are taken into account.

So in my State of Oklahoma, the effect of the EPA rules is already being felt with two powerplants being idled as a result of just the EPA's rules.

So I applaud the efforts of the House of Representatives to direct the EPA to move forward in a sensible manner. It is unfortunate that we are kind of ignoring that over here on this side, the plight of the business community. And you know, this isn't unique to Oklahoma. You can go anywhere and they will tell you that the regulations are just killing us.

The Senate leadership is a major obstacle to relief. Recently, we learned from the EPA's Inspector General, a request that I made some 16 months ago, that the agency circumvented its own peer-

review process in the rush to issue the climate regulation. We are talking about the endangerment findings. And I can remember so well in I think it was December 2009, right before Copenhagen, when we knew that they were going to have an endangerment finding.

And I said when you have this endangerment finding, what science will it be based on? And they said it would be on the IPCC science, which has been debunked. And now we find out just recently this last week from the Inspector General that they had, in fact, cooked the science.

So, just last week, I might add also, the Majority Leader, Harry Reid, changed longstanding Senate rules to protect EPA's authority to regulate farm dust. Now, with all these regulations, all the MACTs, the boiler MACTs, and farm dust, I had a news conference in my State of Oklahoma in the far southwestern part, southwest of where you and I were shooting birds the other day, and a lot of people came. We had some people there who had never been west of the Mississippi.

And so I said, now, see this brown stuff down here? That is dirt. Now, see that round green thing? That is cotton. Now, put your finger in the air. That is wind. Are there any questions?

There is no technology that is going to regulate farm dust. And this is a problem. I know we are a farm State and people are just, it is just, the regulations are killing our farmers.

So I am glad we are having the hearing. I hope we will get to some reasonable response. Green jobs are fine. I love green jobs. When the technology is there, we are all for it. In the meantime, you have to run this machine called America and we need our current available energy.

Geothermal is doing a wonderful thing. I am real excited that we are at the cutting edge of that. But also just recently we have been acknowledged as having the largest recoverable reserves of coal, oil and gas of any country in the world, and that is what is going to keep us going during the time that we are working on our technology.

Thank you, Mr. Chairman.

Senator SANDERS. Thank you.

Senator Whitehouse.

OPENING STATEMENT OF HON. SHELDON WHITEHOUSE, U.S. SENATOR FROM THE STATE OF RHODE ISLAND

Senator WHITEHOUSE. Thank you, Mr. Chairman.

Senator INHOFE. Oh, could I interrupt for a minute? I have to apologize. I have a Senate Armed Services meeting, so I would like to stay for all of this. I will be coming back. I am sorry for the interruption.

Senator WHITEHOUSE. Thank you, Mr. Chairman, for the opportunity to introduce Edward White of National Grid, which is the company that provides virtually all of the electricity and natural gas service in my home State of Rhode Island. This is a company that, dating back to its time as Narragansett Electric, has been a real leader in energy conservation efforts back in the 1980's.

I want to say that Narragansett Electric was the first company to engage in conservation-based rates. I was a young attorney for

the Attorney's General Office. And together with the business community and the environmental community, we agreed on conservation-based rates, demand-side management, cogeneration rates, things that were a novelty at the time.

So I would ask both of my Chairmen, both the Chairman from Vermont and the Chairman from California, to recognize that Rhode Island has actually shown a lot of leadership in this area. I think we may have been first off the mark.

And that tradition continues with National Grid today through their programs like the least-cost procurement program which supports cost-effective gas and electric energy efficiency; programs where they are cost-justified. And as you have mentioned, Mr. Chairman, the on-bill repayment program which gets around a sort of capital obstacle with its reliance on economics and allows corporations, communities, businesses, municipalities and individuals to reap the savings that new technologies permit.

So I am delighted to be here with him. I have to go to the floor so I am not going to be here through the whole hearing, but let me close by thanking the men and women of National Grid for the effort that they have put in the storm that Vermont felt so harshly recently, to make sure that power came back fairly quickly to Rhode Island.

So those who were three, 4 days without power, obviously it was a very frustrating time, but I think that National Grid and their employees worked terribly hard to get people back as quickly as they could. We had folks from the Federal Government in and they described how National Grid had performed well above expectations, well above what the national averages are for this, and they really put their heart and soul into trying to get people back online as quickly as they could.

So both for their long tradition of leadership in conservation focus in the utility community and for their recent work, it is great to be with you, Ed, and thank you for being here today.

Senator SANDERS. Thank you, Senator Whitehouse.

Senator Merkley.

OPENING STATEMENT OF HON. JEFF MERKLEY, U.S. SENATOR FROM THE STATE OF OREGON

Senator MERKLEY. Thank you, Mr. Chair. I am going to pass on an opening statement so we can get right on to witnesses.

Senator SANDERS. Now we are going to hear from the panelists. We are going to begin with Mr. Edward White, Jr. Mr. White serves as the Vice President of Energy Products in the Customer Energy Solutions Group at National Grid. He has provided his expertise in energy to the National Grid, one of the largest and best-known energy companies in the world for 15 years. Prior to his role as Vice President of Energy Products, he led development of a large distributed solar installation and served as U.S. lead for the National Grid's Energy Management System.

Mr. White, thanks for being with us.

STATEMENT OF EDWARD WHITE, JR., VICE PRESIDENT OF ENERGY PRODUCTS, NATIONAL GRID

Mr. WHITE. Great. Thank you. And thank you to Senator Whitehouse, who I know had to step out.

Good morning, Chairman Sanders, Chairman Boxer, Ranking Members Boozman and Inhofe and Members of the Subcommittee. It is an honor to appear before you today on behalf of National Grid to discuss our customer energy efficiency program.

My name is Ed White. I am the Vice President of Energy Products for National Grid. One of my key areas of responsibility, as the Senator just outlined, is to develop and get approved through our State regulators efficiency programs to help our customers where they live, work and play.

I have seen first-hand where energy efficiency programs help customers become more competitive, create jobs and reduce emissions. We support the Subcommittee's efforts to advance energy efficiency.

National Grid is an international energy delivery company based in Waltham, Massachusetts, with other key offices in Providence, Rhode Island, Albany, Brooklyn, Buffalo and Syracuse, New York. National Grid provides electricity to approximately 3.3 million customers in Massachusetts, New York, New Hampshire and Rhode Island and manages the electricity network for the Long Island Power Authority.

We are the largest distributor of natural gas in the Northeast, and we are one of the largest investor-owned utilities in the United States as measured by customer count.

In these uncertain and difficult economic times, making smart investments in energy is of critical importance. Our Country and the local communities we serve need job creation, energy security and cleaner ways to power our economy. Investing and promoting energy efficiency has the potential to help address each of those important challenges.

Studies have shown that energy efficient investments typically produce three to four dollars in savings for every dollar invested. We have seen that in Vermont. We have seen that in California and we have seen that in other States.

As an example, over the last 3 years, our total savings through new energy efficiency investment in Massachusetts is expected to save over 1 million megawatt hours. This is as much electricity as would be used to power 92,000 average homes for a year.

As our energy efficiency programs grow and our customers' desires to participate grow, we need to advance the tools used to deploy these programs. These tools come in many forms, shapes and sizes, from emerging technologies like LED lighting, to advanced financing and payment options like what we are talking about here today.

On-bill financing, or as we call it on-bill repayment, provides our customers a way to enjoy energy savings today, but pay for those savings over time. It encourages customers to make the capital improvements that they otherwise would not make, which helps them to create jobs, remain competitive, conserve energy and reduce emissions in our communities and in our regions.

Here are just a couple of examples where our on-bill repayment program has helped our customers directly. Specifically, in Warwick, Rhode Island, National Grid worked on a large lighting replacement job with a major hotel. By replacing their inefficient lighting fixtures with 1,900 LED lamps, the hotel saved over 1 million kilowatt hours per year, and that will be for years to come. That translates to significant savings that help go to their bottom line.

In Cranston, Rhode Island, the city was lacking the necessary funds, just like a lot of communities around all of our territories, to do an efficiency lighting project for their School Department. With on-bill repayment, the city is now able to pay for the projects from the savings on their electric bill.

On-bill repayment has helped numerous other projects become possible across the States we are so proud to serve. From the local florist to the grocery store owner, who both replaced outdated inefficient lighting, these jobs would not have moved forward without our on-bill repayment program.

On-bill repayment programs help create economically sound projects that pay for themselves, put Americans back to work and reduce emissions. We welcome the efforts of the Subcommittee to evaluate the appropriate Federal involvement for energy efficiency programs and respectfully encourage you to consider complementary policies that would maximize the economic impact of the existing State programs.

Thank you for your consideration and I look forward to questions.

Thank you.

[The prepared statement of Mr. White follows:]

Written Testimony

Edward White, Jr.
Vice President, Energy Products
National Grid

To

United States Senate
Committee on Environment and Public Works
Subcommittee on Green Jobs and the New Economy

In re

Innovative Practices to Create Jobs and Reduce Pollution

October 13, 2011

Good morning Chairman Sanders, Ranking Member Boozman, and Members of the Subcommittee. It is an honor to appear before you today on behalf of National Grid to discuss our energy efficiency programs. My name is Edward White, and I am Vice President of Energy Products for National Grid. I manage National Grid's energy efficiency initiatives and have seen first-hand the potential for efficiency-focused investment to create jobs and reduce emissions. National Grid supports the Subcommittee's efforts to advance energy efficiency.

About National Grid

National Grid is an international energy delivery company based in Waltham, Massachusetts, and Brooklyn and Syracuse, New York. Our parent company, National Grid plc, is based in the United Kingdom. National Grid provides electricity to approximately 3.3 million customers in Massachusetts, New Hampshire, New York and Rhode Island, and manages the electricity network on Long Island, New York under an agreement with the Long Island Power Authority (LIPA). In 2009, our electric utilities delivered close to 32 million megawatt-hours of electricity to power homes, schools, businesses, and factories across our service territories. We are the largest distributor of natural gas in the

northeastern United States, serving approximately 3.4 million customers in Massachusetts, New Hampshire, New York, and Rhode Island. National Grid also owns over 4,000 megawatts of contracted electricity generation that provides power to over one million LIPA customers. We are one of the largest utilities in the United States, as measured by total customers.

We welcome the opportunity to speak about energy efficiency before this Subcommittee. In these uncertain and troubling economic times, making smart investments is of paramount importance. Our country needs job creation. Our country needs energy security. Our country needs cleaner ways to power our economy. Investing in energy efficiency has the potential to help address each of these challenges.

National Grid has been at the forefront in the push to implement energy-savings programs. The three states that incorporate the largest portions of our service territory– Massachusetts, New York, and Rhode Island – have each set goals of reducing energy use by as much as two percent per year. These states, along with 23 others, have recognized that energy efficiency is the cheapest way to meet new and existing demand. Many utility regulators have established rules that require utilities, such as National Grid, to invest in cost-effective energy efficiency before investing in new power plants.

Working with our regulators at the state level, and with local energy efficiency services contractors, we have deployed programs to invest millions of dollars to enable our customers to make cost-effective energy efficiency improvements. These projects have yielded positive returns for our customers, created jobs for thousands of workers, and saved millions of megawatt-hours of electricity.

Cost-effective energy efficiency measures allow us to provide customers with one kilowatt-hour of energy savings for between three and five cents. In comparison, customers around

the United States pay between 6.5 cents and 16.5 cents for their electricity, depending on where they live. As a result, investing in energy efficiency can typically produce three to four dollars of savings for each dollar invested. In 2012, our total savings through new energy efficiency investment in Massachusetts is expected to be over one million megawatt-hours – as much electricity as 92,000 typical homes would use in a year.

National Grid's energy efficiency programs have been growing steadily in each of the states where we operate. Working with the state regulators in Massachusetts, New Hampshire, New York, and Rhode Island, we have established a total budget of over $1 billion for energy efficiency programs from 2010 through 2012. As with many utility-sponsored efficiency programs, this money comes from both public and private sources. We have a variety of ways to deploy the funds, ranging from rebates to interest rate subsidies to customer loans.

As our efficiency programs undergo rapid growth, we rely increasingly on customer payment plans that allow our customers to make energy efficiency improvements and pay for them in installments on their electric bill. We have seen this to be a highly effective way to spur energy efficiency investment. In essence, this so-called "on-bill" repayment method provides customers a way to enjoy energy savings today, but pay for those savings over time. It encourages customers to make capital improvements that they would not have otherwise made. Every new project means additional jobs, additional reductions in energy use, and fewer emissions. Energy efficiency provides these benefits while at the same time it delivers long-term savings to customers by reducing individual electric bills and bringing down the cost to procure electricity for our customers.

Most of National Grid's on-bill repayment programs have focused on the small commercial customer segment, but we are likely to expand to other segments as our programs evolve. Our experience shows that on-bill repayment arrangements have low default rates. Customers are already in the habit of paying their monthly electric bill, and the energy

savings from efficiency measures often exceed the amount added to their bill. The structure is very easy for customers. We have measured default rates of between zero and 3.5 percent, depending on the customer class. These rates would be considered well within the range of "investment grade" using current credit rating systems.

Another benefit of on-bill repayment programs is that they can incorporate funding from outside lenders. In fact, much of the projected growth in our three-year plan relies on outside funding sources: $180 million of it, to be precise. This money comes from third-party lenders – not from the utility, customers, or the public benefit funds overseen by the utility commission. Our on-bill programs mobilize this capital to create immediate economic benefits.

On-bill repayment programs have been used successfully by National Grid to fund capital investments in an array of state-of-the-art, energy efficient technologies. We and our customers have invested in water heaters and boilers, pumps and drives, lighting, insulation, and air sealing. Each project draws a long list of implementation partners: local contractors and installers; equipment manufacturers and distributors; engineering firms; architects and many others.

Here are some examples of how our energy efficiency programs have worked:

- National Grid worked on a large lighting project with a major hotel in Warwick, RI. The hotel replaced out-of-date halogen and incandescent light fixtures and installed approximately 1,900 LED lamps along with fluorescent lamps and ballasts. The project saved the hotel over one million kilowatt-hours per year. The use of on-bill repayment enabled the hotel to defer the initial capital expense and generate immediate positive cash flow.
- On-bill repayment was instrumental in helping the city of Cranston, RI undertake an energy-efficient lighting project in the school department. The project involved the replacement of 48 inefficient gymnasium light fixtures with energy efficient fluorescent fixtures at a middle school. The project would not have happened without the on-bill repayment program, because the city lacked the funds needed to make the capital investment. The city is now able to pay for the project out of savings on its electricity bill.

- In Massachusetts, five schools in a southeastern Massachusetts school district saw energy savings potential but had no capital budget. National Grid provided technical assistance and set up an on-bill repayment arrangement that ensured the school district would see positive cash flow from energy savings due to upgrades to lighting and building systems.
- On-bill repayment has made numerous other projects possible for building owners that lacked the capital reserves to make the necessary up-front investment. In Providence, RI a grocery store replaced outdated, inefficient lighting. In Cumberland, RI an architectural woodworking company, also undertook a project to replace inefficient area lighting.

Through on-bill repayment programs we are creating economically sound projects that pay for themselves –putting Americans to work, modernizing our buildings, schools, and homes, and reducing emissions. Energy savings and economic growth are consistent. From 1999 through 2009, Massachusetts' economic output grew by nearly four percent per year, but the state's electricity consumption only grew less than one percent per year.[1] This is exactly the sort of trend we need at a national level.

Therefore, we welcome the efforts by the Subcommittee to evaluate appropriate federal incentives for energy efficiency programs. We also respectfully encourage you to recognize existing state-level energy efficiency programs and consider complementary policies that would maximize their economic impact.

National Grid would be pleased to work with the Subcommittee to identify and evaluate options for federal legislation. Thank you for your consideration. I would welcome any questions you may have.

[1] U.S. Department of Commerce, Bureau of Economic Analysis; Energy Information Administration, 2009.

nationalgrid

Edward H. White
Vice President, Customer & Business Strategy
National Grid

Follow up questions from Chairman Barbara Boxer to Ed White regarding the Environment and Public Works Subcommittee Hearing of October 13, 2011 entitled, "Innovative Practices to Create Jobs and Reduce Pollution."

1. Mr. White, your testimony states that National Grid's innovative financing and repayment programs have been used to fund an array of state-of-the-art, energy efficient technologies. Could you describe some of these technologies and the types of partners that your company has worked with to implement and maintain these investments?

National Grid's financing (on bill repayment (OBR)) provides our customers the option to pay for the energy efficient installations on their energy bills. The alliances that we work with to implement and maintain these investments are our customers, engineering firms that analyze the energy savings, start-up companies that develop new innovative technologies, contractors that perform the energy efficient installations, and distributors and manufacturers who supply the equipment. These alliances lead into energy efficient sustainable environment and job growth in the sector.

Some of the technologies we promote are indoor lighting utilizing light emitting diodes ("LED lighting") which replace older technologies such as compact fluorescent or incandescent lighting; LED lighting for food and beverages refrigerated cases in supermarkets and convenience stores; ductless air conditioning equipment for small size businesses; building energy management systems to optimize the temperature set points as well as the start and stop of heating and air conditioning equipment; and refrigeration controls especially in supermarkets and convenience stores. Through OBR, National Grid promotes new technologies for municipal waste water treatment plants such as fine bubble aeration and technologies for hospitals, universities, and food processing facilities such as combined heat and power (CHP) systems. In addition to generating on-site electricity, the heat generated from CHP is utilized to generate domestic hot water or provide heating during cold weather.

2. Mr. White, could you please describe some of the work your company has done with schools to increase their energy efficiency with the use of innovative financing and repayment programs?

National Grid's on-bill repayment (OBR) has provided assistance to countless school systems that do not have the funds in their capital budgets to move forward with energy efficiency projects. These projects include innovative lighting designs that are coupled with occupancy and day lighting sensors to optimize the desired lighting in a classroom. Also the installation of building energy management systems, to optimize the temperature set points as well as the start and stop of heating and air conditioning equipment, are major contributors to energy savings in schools. National Grid works with school departments on the installation of these systems. In many cases the energy savings on a monthly basis are greater than the OBR cost, meaning the school finds themselves in a net positive cash flow basis. Schools increased their participation in energy efficiency projects dramatically (by a factor of 2 -3 times participation rates) once OBR was made available to them.

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Senator SANDERS. Mr. White, thank you for your testimony and for what you are doing.

Our next panelist is Kyle Kempf. Mr. Kempf is the Senior Director of Government Affairs for the National Small Business Association, serving over 150,000 small businesses. Kyle advocates on energy, environmental, regulatory and economic development issues on behalf of small businesses. He currently administers the National Small Business Association Political Action Committee. After graduating from Boston University summa cum laude, he served offices in the U.S. Senate, British Parliament, and European Parliament prior to joining the National Small Business Association.

Mr. Kempf, thanks for being with us.

Mr. KEMPF. Thank you. And the PAC is mostly dormant, so please don't call.

[Laughter.]

STATEMENT OF KYLE W. KEMPF, SENIOR DIRECTOR, GOVERNMENT AFFAIRS, NATIONAL SMALL BUSINESS ASSOCIATION

Mr. KEMPF. Good morning, Chairman Sanders, Chairwoman Boxer, Ranking Member Boozman and Members of the Committee. Thank you for inviting me here today to discuss the benefits of innovative practices that have great benefit to small businesses, to the U.S. economy, and the environment, on-bill financing.

My name is Kyle Kempf. And Chairman Sanders, I am Senior Director of Government Affairs for the National Small Business Association, America's oldest small business advocacy organization. Since 1937, NSBA has worked in a nonpartisan manner to promote policies beneficial to the small business community.

On-bill financing is a collaborative mechanism among utilities, contractors and customers aimed at making it as easy as possible for small business owners to invest in energy efficiency upgrades, alternative energy sources, and to save money.

To be honest, this is the main attraction for most small business owners. On-bill financing saves them a lot of money. Energy is a very high-overhead expense for many small businesses, one for which most have little to no control. In fact, many small businesses, particularly those with fewer than 35 employees in the manufacturing sector, pay 35 percent more per unit for their electricity than their larger counterparts.

Given the situation, one might surmise that small business owners have rushed in to invest in energy efficiency upgrades or alternative energy production, but this is not the case. Only 40 percent of the respondents to NSBA's 2011 energy survey reported investing in energy efficiency improvements in the last 18 months or plan to do so; and only 16 percent conducted an energy audit in the previous 2 years.

Small business owners obviously are eager to cut costs whenever and wherever they can, so what is holding them back? When asked why they had not conducted an energy audit, 30 percent of the respondents cited the cost; 22 percent identified a lack of information on service providers or the auditing process; and 18 percent said a shortage of time; 40 percent of the respondents cited cash-flow as the main obstacle to making their small business more energy efficient.

In short, small business owners lack the necessary money, time and reliable information to invest in energy efficiency upgrades and alternative energy production. On-bill financing resolves each of these impediments.

In 2009, NSBA issued a report, On-Bill Financing: Helping Small Businesses Reduce Emissions and Energy Use While Improving Profitability, which highlighted how much small business owners could save by using on-bill financing programs. On-bill financing program administrators report the utility bill savings of 15 to 30 percent are highly typical, usually by the simple adoption of existing energy efficiency strategies. Although energy cost savings will vary greatly from one small business to another, the report found that an average small business could save $4,932 each year on its energy bills, with many saving much more.

To illustrate, I would like to share some specific examples of actual small business owners who used on-bill financing to reduce their energy costs. In West Haven, Connecticut, Chick's Drive In, a small family owned restaurant known for its hot dogs and lobster rolls, used the on-bill financing program at United Illuminating to improve its energy efficiency.

Following the energy audits of an improved U.I. vendor, obsolete fluorescent interior lighting was replaced with high-efficiency lighting, occupancy sensors were installed in work areas where there generally was little activity and high-intensity exterior lights were replaced with more efficient pulse-start technology, while motor and evaporator fan controls were upgraded. In total, the improvements cost about $32,000, although the utility subsidized approximately $15,000.

The upgrades are expected to provide Chick's with remarkable savings of approximately $9,000 per year, which means that the loans should be paid off in about 2 years.

A small grocer in California used the on-bill financing program offered by San Diego Gas & Electric to invest about $20,000 in improved lighting and refrigeration efficiency. The grocer received a rebate of nearly $6,000, leaving him with just more than $14,000 to pay back. The estimated annual energy costs savings resulting from these improvements were nearly $6,000.

For the 31-month loan term, this result in a customer fixed monthly loan payment of $463.73, which should go unnoticed given that the grocer is expected to realized over $475 per month in monthly energy savings. Following the 31-month payback period, this small grocer simply will get to keep these savings.

Firms located in areas that do not offer on-bill financing programs are significantly less likely to make these sorts of investments. In addition to significant financial savings for small business owners, NSBA's on-bill financing report found that the environmental outcome of the widespread adoption of similar programs would be enormous.

The report found that small businesses, as a whole, could reduce greenhouse gas emissions by 250 million tons each year if they improved their energy efficiency by 30 percent. Incredibly, this is the equivalent of emissions from 31 coal-fired powerplants.

On-bill financing represents an effective way to help small businesses afford critical energy upgrades. These improvements benefit

small business owners' bottom lines, the sizable sector of the small business community engaged in energy audits, efficiency retrofits, and alternative energy production, and the environment.

Thank you again for the opportunity to appear before you today. I welcome any questions.

[The prepared statement of Mr. Kempf follows:]

NSBA
National Small Business Association®

TESTIMONY
OF
KYLE W. KEMPF
Senior Director, Government Affairs

NATIONAL SMALL BUSINESS ASSOCIATION

"Innovative Practices to Create Jobs and Reduce Pollution"

Before the U.S. Senate Committee on Environment and Public Works Subcommittee on Green Jobs and the New Economy

October 13, 2011

Good morning Chairman Sanders, Ranking Member Boozman, and members of the committee; thank you for inviting me here today to discuss the benefits of an innovative practice that is of great benefit to small businesses, the U.S. economy, and the environment: On-Bill Financing.

My name is Kyle Kempf and I am the senior director of government affairs for the National Small Business Association (NSBA), America's oldest small-business advocacy organization. Since 1937, NSBA has worked in a nonpartisan manner to promote policies beneficial to the small-business community.

On-Bill Financing: How It Works

On-Bill Financing is a collaborative mechanism among utilities, contractors, and customers aimed at making it as easy as possible for small-business owners to invest in energy-efficiency upgrades and alternative-energy sources, while realizing immediate financial benefit.

Before an On-Bill Financing program is enacted, a utility must identify a source of capital for the program. While some utilities are able to use their own capital, most rely on ratepayer funds to finance them. Unfortunately, such ratepayer funds are not available in all areas. The scarcity of capital sources has significantly impeded the spread of On-Bill Financing programs around the country.

Once a utility has located a capital source, it must identify and certify a network of contractors—usually with backgrounds in remodeling, lighting, heating, ventilation, or air conditioning—who will perform energy audits.

It is worth noting that that vast majority of these contractors are themselves small businesses. In fact, small firms provide most of the services now offered in any utility-operated energy-efficiency program, usually including everything except program administration and quality assurance, which the utilities operate. For example, more than 92 percent of the Air Conditioning Contractors of America membership base (providing services to the HVAC industry) has fewer than 50 employees—and 96 percent has less than 100 employees.

Frequently, these contractors then help identify the small-business utility customers who would most benefit from the program. Having identified a potential participant, the contractor performs an energy audit of the business premises to identify possible cost-effective efficiency measures. These audits typically take from one to four hours. At the end of the audit, the contractor sets an appointment with the small-business owner to return and present his results.

The contractors usually then enter the data they gathered during the energy audit into a standardized program and database, which produces a report detailing the measures and potential energy and cost savings for the small-business owner.

At this point, the contractor also usually works with the utility to evaluate the loan application. Ordinarily, this evaluation is based on factors such as how many years the applicant has been in business and his or her bill-payment history.

Once the application has been evaluated, the contractor once again visits the small-business owner to outline the specific improvements that could be achieved. The small-business owner may choose some or all of the measures, depending on how large a project he or she financially wants to commit to, how significant the financial benefit is, etc., but at this point he or she commits to the On-Bill Financing program.

The terms of the existing On-Bill Financing programs differ but utilities generally offer small-businesses loans at a zero percent interest rate for two to five years. Utilities also usually offer rebates ranging from 10 percent to as high as 70 percent of the total project cost.

Subsequently, the contractor—again, normally another small business—performs the upgrades and submits his invoice to the utility for payment. The utility oftentimes conducts a post-installation inspection; with the contractor remedying any identified deficiencies.

The utility then pays the contractor and begins placing a new energy-service charge for repayment on the small business's bill. The charge generally should be less than the energy cost savings. While small-business energy-efficiency projects vary greatly according to a variety of factors, they generally range from $8,000-$12,000.

Why On-Bill Financing is Attractive to Small-Business Owners

Energy is a very high overhead expense for many small businesses, one for which most have little control. This is most obviously reflected in the fact that small businesses often pay more for energy than comparable large firms.

A 2008 report, "Characterization and Analysis of Small Business Energy Costs," from the U.S. Small Business Administration Office of Advocacy found "significant price differentials between what the smallest and largest entities paid for energy in the commercial and manufacturing sectors." Many small businesses—particularly those with fewer than 35 employees in the manufacturing sector—pay 35 percent more per unit for their electricity than their largest counterparts.

Given this situation, one might surmise that small-business owners have rushed to invest in energy-efficiency upgrades or alternative-energy sources for their firms. This is not the case. Only 40 percent of the respondents to NSBA's 2011 Energy Survey—which will be released next week—reported investing in energy-efficiency improvements in the last 18 months or plans to do so; and only 16 percent said they had conducted an energy audit in the previous two years.

Small-business owners obviously are eager to cut costs whenever and wherever they can, so what is holding them back? When asked why they had not conducted an energy audit, 30 percent of the respondents cited the cost, 22 percent identified a lack of information on service providers or the auditing process, and 18 percent said a shortage of time. Forty percent of the respondents cited cash flow as the main obstacle to them making their small business more energy efficient.

In short, small-business owners lack the necessary money, time, and reliable information to invest in energy-efficiency upgrades and alternative-energy production. On-Bill Financing resolves each of these impediments.

The Potential Benefits of On-Bill Financing

In 2009, NSBA issued—conducted with funding from the Bipartisan Policy Center—the report, "On-Bill Financing: Helping Small Business Reduce Emissions and Energy Use While Improving

Profitability." The report outlined how On-Bill Financing programs work and explored their track record of success.

The study highlighted how much small-business owners could save by using On-Bill Financing programs to invest in their firms.

On-Bill Financing program administrators report that utility bill savings of 15-30 percent are highly typical—usually by the simple adoption of existing energy-efficiency strategies. Lighting alone can represent up to 40 percent of typical energy consumption in a commercial building and improved lighting is a simple and easy way to improve a small-business's efficiency.

Although energy cost savings will vary greatly from one small firm to another, the report found that an average small business could save $4,932 each year on its energy bills—with many saving much more.

Specific Examples

To illustrate, I would like to share some specific examples of actual small-business owners who used On-Bill Financing to reduce their energy costs.

In West Haven, Connecticut, Chick's Drive In—a small, family-owned restaurant known for its hot dogs and lobster rolls—used the Energy Efficiency Fund's Small Business Energy Advantage (SBEA) program at United Illuminating (UI) to improve its energy efficiency.

The UI SBEA program is designed to provide cost-effective energy-saving services for small commercial and industrial customers lacking the financial resources or in-house expertise to analyze and reduce their energy usage.

Following the energy audit from an approved UI vendor, obsolete T12 fluorescent interior lighting was replaced with high-efficiency T8 lighting, occupancy sensors were installed in work areas where there generally was little activity, high-intensity exterior lights were replaced with more efficient pulse-start technology, and motors and evaporator fan controls were upgraded. In total, the upgrades cost about $32,000—although the Energy Efficiency Fund subsidized approximately $15,000.

The upgrades are expected to reduce Chick's annual electricity consumption by approximately 48,639 kilowatt-hours a year, however. This equals a remarkable savings of roughly $9,000 per year, which means that Chick's loan should be paid off in about two years.

A small grocer in California used the On-Bill Financing program offered by San Diego Gas & Electric to invest $20,292 in improved lighting and refrigeration efficiency. The grocer received a rebate of $5,916.50, leaving him with $14,375.50 to pay back to the utility. The estimated annual energy costs savings resulted from the improvements were $5,737.45.

This translates into a payback period of 30 months. The loan term extended to the grocer by San Diego Gas & Electric was 31 months. This resulted in a customer fixed monthly loan payment of $463.73. This will loan go will practically unnoticed, given that the grocer is expected to realize $478.12 in monthly energy savings which will be used for loan repayment. Following the 31-month payback period, this small grocer simply will get to keep all of his savings.

A small retailer used San Diego Gas & Electric's On-Bill Financing program to invest $7,512.70 in lighting-efficiency improvements. This small-business owner also received a rebate for $817, leaving a total customer loan of $6,695.70. The loan term extended by the utility was 29 months. This left the small retailer with a fixed monthly loan payment of $230.89, but expected monthly energy savings of $236.43.

A health care center in Santa Ana, California installed $18,900 worth of Ozone Technology at its laundry facility to reduce the use of hot water and dryers' gas consumption. With a $9,450 incentive, this left the small-business owner with a total loan amount of $9,450. This investment left the owner with an estimated annual energy savings of $17,217 and a payback period of only ten months.

In areas that lack On-Bill Financing programs, the decision to invest in energy-efficiency upgrades or alternative-energy production is more difficult—even when potential cost savings are evident. Walco, a remanufacturing company located in Providence, Rhode Island took advantage of an energy-savings initiative sponsored by its local utility. Through the program, Walco was able to update the lighting system in its 40,000 sq. ft. production area with energy-efficient lighting. Roughly 50 percent of the approximately $52,000 cost was underwritten by the utility. The balance

was covered by Walco. Although the net energy costs saved by the new lighting allowed for a 12 month return on investment, Walco was unable to upgrade the lighting of the entire plant because of cash-flow issues. Opportunities like this need not be squandered.

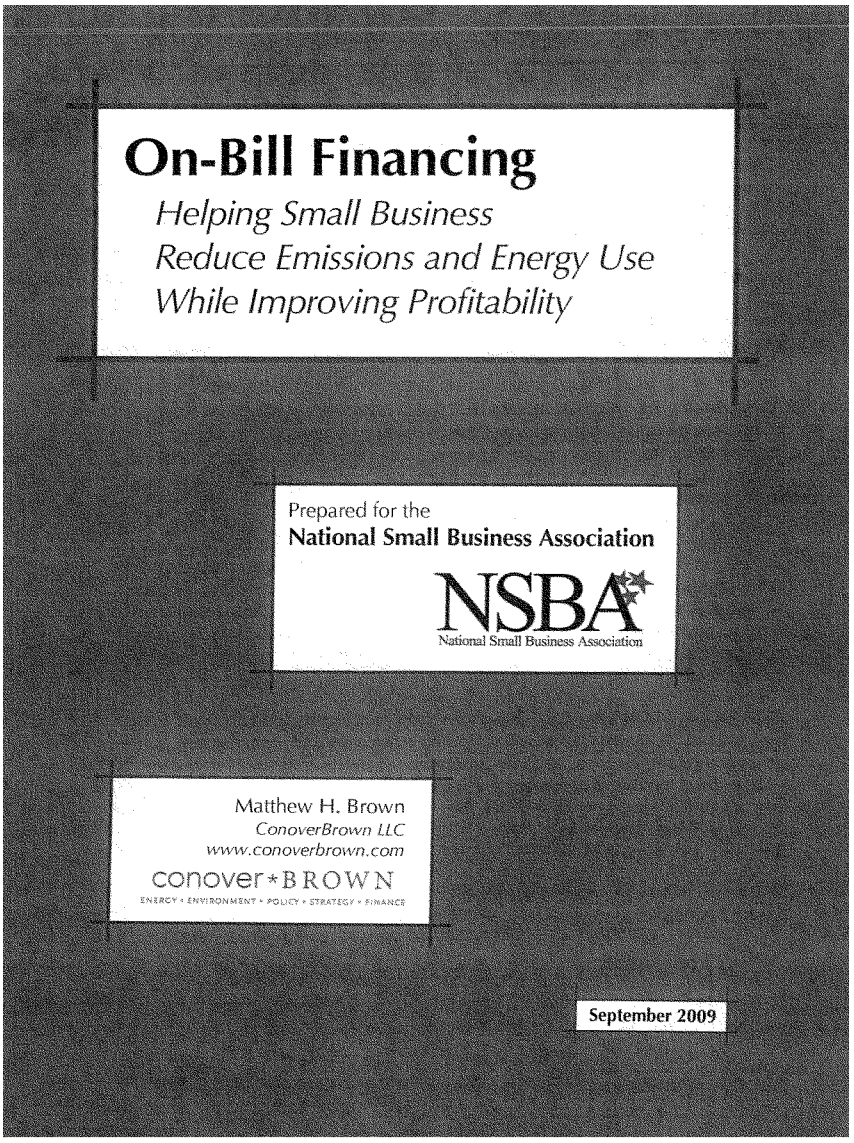
Conclusion

In addition to significant financial savings for small-business owners, NSBA's "On-Bill Financing: Helping Small Business Reduce Emissions and Energy Use While Improving Profitability" report found that the environmental outcome of the widespread adoption of On-Bill Financing would be enormous.

The report found that small businesses as a whole could reduce greenhouse gas emissions by 259 million tons each year if they improve their energy efficiency by 30 percent. Remarkably, this is the equivalent of the emissions from 51 coal-fired power plants.

On-Bill Financing represents an effective way to help small business afford critical efficiency improvements. These improvements benefit: small-business owners' bottom lines; the sizable sector of the small-business community engaged in energy audits, efficiency retrofits, and alternative energy production; and the environment.

Thank you again for the opportunity to appear before you today. I thank you for your time and welcome any questions.


On-Bill Financing
Helping Small Business
Reduce Emissions and Energy Use
While Improving Profitability
Prepared for the
National Small Business Association
NSBA
National Small Business Association
Matthew H. Brown
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FOREWORD

Since 1937, the National Small Business Association (NSBA) has been the nation's leading small-business advocate. As part of NSBA's mission to address the needs and represent the concerns of the small business community, we are pleased to provide you with the findings of the 2009 NSBA report: "On-Bill Financing: Helping Small Business Reduce Emissions and Energy Use While Improving Profitability."

Contrary to the antiquated paradigm that economic growth must run counter to environmental conservation, this study—conducted with funding from the Bipartisan Policy Center—takes an in-depth look at a program that successfully bridges that gap. Currently implemented in several states, "on-bill financing" is a method by which small businesses can improve their energy efficiency through a financing mechanism offered by their utility company.

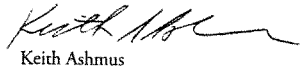
Among the many eye-opening conclusions you'll find in this report, small businesses as a whole could reduce greenhouse gas emissions by 259 million tons million tons each year if they improved their energy efficiency by just 25 percent. Furthermore, through energy efficient upgrades, the average small business could save $4,932 each year on its energy bills. And many could save much more!

The report also makes recommendations on how the federal government can help facilitate additional on-bill financing programs across the country. We believe that improving America's energy efficiency must be a central component of any national energy plan. We also believe that any such plan must incorporate America's small firms. The first step in this process must be devising a mechanism to help small business afford critical efficiency improvements. According to an April 2009 NSBA survey, the number one reason small-business owners cite for their inability to make their firms more energy efficient is cash-flow.

NSBA has long held the belief that energy efficiency and entrepreneurial growth can and do go hand-in-hand. The current state of the U.S. economy makes it absolutely crucial to have government policies that foster, not hinder, entrepreneurial growth. The findings of this report are presented to members of the media and policy makers so that they can make informed decisions when working on energy and small-business issues. With 29.6 million small firms—comprising 99.7 percent of all U.S. employer firms—small businesses stand to make significant, positive and lasting improvements to both the economy and the environment.

We hope you find this report useful, and welcome your feedback as we plan future surveys and research projects.

Todd McCracken
President and CEO



Keith Ashmus
2009 Chair

I. Executive Summary

The importance of small businesses to the U.S. economy is difficult to overstate; small businesses represent 99.7 percent of all the firms in the U.S. that have employees, and have generated the overwhelming majority of new jobs over the past 15 years. As a result of the prominent role that they play in the economy, small businesses also turn out to be critically important to any U.S. strategy to reduce greenhouse gas emissions. This report focuses on a method to not only help small businesses reduce their greenhouse gas emissions, but to help them upgrade their lighting, refrigeration and other energy-consuming equipment while simultaneously increasing their profitability. This method uses financing for energy-efficiency measures that we describe as on-bill financing.

This report finds that small businesses as a whole could reduce greenhouse gas emissions by 259 million tons each year if they improve their energy efficiency by 25 percent—the equivalent of the emissions from 51 coal-fired power plants. Energy cost savings for small businesses will vary tremendously from one small business to another; however, on average, a small business that matches the national average will save approximately $411 per month or $4,932 per year on the combination of natural gas and electricity bills.

These energy cost savings are critical to small businesses because they often pay more for energy than comparable large firms. Many small businesses—particularly those with fewer than 35 employees in the manufacturing sector—pay 35 percent more per unit for their electricity than their largest counterparts.

Despite the benefits of efficiency investments, challenges remain. These include:

> ***Cash flow:*** With tight margins and relatively small revenues, many small businesses find it challenging to undertake new capital investments, even if they will save money over time. Fifty-two percent of small-business owners see cash flow as the primary barrier to investing in energy efficiency.
>
> ***Up-front capital required:*** A typical energy-efficiency project might cost from $7,500 up to more than $20,000, with some projects costing a bit less and a few costing far more.
>
> ***Energy efficiency is only one priority among many:*** Small-business owners are heavily focused on the business at hand: managing inventory, maintaining payroll, providing health insurance, etc. They rarely have the time to focus on their energy bills, on energy-efficiency measures, or on their greenhouse gas emissions profile.

In order to overcome these challenges, any successful strategy to help small-business owners to reduce their greenhouse gas emissions must be simple, easy-to-use, and resolve the first-cost barrier. It must be effective, yet not divert from the core competencies and concerns of small-business owners. On-bill financing for energy efficiency is one such financing mechanism that has proven to be highly effective.

On-bill financing reduces small businesses' upfront costs for energy-efficiency investments to zero by financing all costs not covered through rebates. Most importantly, it stretches out the financing costs over a sufficiently long period and uses low enough interest rates that the result is cost savings from day one of the agreement. Small businesses actually see lower utility bills, not to mention improved energy efficiency and newer equipment—all while reducing greenhouse-gas emissions.

Lighting upgrades dominate the list of measures financed through on-bill programs today—representing as much as 75 percent of such measures—but they are by no means the only manner with which small businesses achieve increased efficiency. Improved refrigeration, heating and air conditioning systems, insulation and motors also are common.

On-bill financing efficiency programs are under development in Illinois and Michigan and now operate in several states including Arkansas, California, Connecticut, Hawaii, Kansas, Massachusetts, New Jersey and Rhode Island. Connecticut and California utilities operate the largest on-bill financing programs and have seen successful and rapidly growing programs.

This paper concludes that two barriers are worthy of particular attention.

1. The two most established on-bill financing programs are running up against their state regulatory commission-imposed caps on outstanding loans. This problem is caused by the programs' success, indicating that they are popular with small businesses. One constraint that these programs will face, and a constraint that others are likely to encounter in the future, is the availability of low cost or zero cost capital to fund a revolving on-bill loan program.

2. Although default rates for loan programs have been lower than one percent, default risk and credit risk remain a critical concern for lenders, for utilities and for the state utility commissions that oversee utility rates. On-bill financing programs will not be able to raise private capital without a clear definition of who bears the risk for potential loan defaults.

As a result, two options and steps should be considered:

1. Make a pool of capital available to utilities that agree to match federal funds with their own loan capital. This approach would have the effect of expanding the capital available to fund small-business on-bill loans, thus helping to overcome to provide a barrier of a lack of capital for such programs.

2. Make funding available upon application and approval, as a guarantee of new on-bill loans that meet specific requirements. Such a guarantee could be structured to take into account the historically low default rates with on-bill finance programs, and be set based upon a maximum amount of funding for each lending utility.

Senator SANDERS. Thank you very much, Mr. Kempf.

Mr. Philip Schoen is the founder of GEO-Enterprises, a leader in the geothermal industry with more than 30 years of industry experience. He currently serves on the Advisory Council of the International Ground Source Heat Pump Association and sits on the Board of Directors for the Geothermal Heat Pump Consortium.

Mr. Schoen has designed and installed various types of ground heat exchangers, including systems used by the Department of Defense, U.S. embassy housing, and the 2008 Olympics in Beijing.

Mr. Schoen, thanks very much for being with us.

STATEMENT OF PHIL SCHOEN, CEO, GEO-ENTERPRISES

Mr. SCHOEN. I am Phil Schoen, CEO of GEO-Enterprises, an Oklahoma-based company that I founded in 1997, which specializes in design and application of geothermal heating and cooling solutions.

GEO-Enterprises has 24 employees and our company provides a wide range of services, as thermal conductivity testing, modeling of heat exchangers, and complete turn-key installations for residential and commercial projects.

I am pleased to participate in today's hearings on behalf of the GEO, the Geothermal Exchange Organization, a nonprofit trade association representing the U.S. geothermal heat pump industry. I serve on the Board of GEO and I have worked in the industry for 30 years.

Before I offer some thoughts about innovative strategies that can expand our industry, lower energy costs for consumers and reduce emissions, let me briefly describe how our technology works. A geothermal heat pump is a 50-State clean energy renewable technology that uses solar energy stored beneath the Earth's surface to heat and cool residential and commercial buildings and provide hot water at a rate 40 percent to 70 percent cheaper than conventional heating-cooling technologies.

While conventional furnaces and boilers burn fuel to generate heat, geothermal heat pumps use minimal amounts of electricity to transfer heat between the Earth and the building, allowing for higher efficiencies and more efficient than fuel-burning heaters which can burn at efficiencies of 95 percent, but geothermal heat pumps leverage that by over 400 percent.

Geothermal heat pumps use 25 percent to 50 percent less electricity than conventional heating and cooling systems. According to the Environmental Protection Agency, they can reduce consumption and corresponding emissions by 44 percent to 72 percent as compared to traditional heating and cooling equipment.

Despite this well-documented energy efficiency, our industry still is relatively small, with less than 5 percent of the market penetration for new construction. And the primary barriers to expanding our industry include high initial installation costs, lack of consumer awareness, the need for more qualified design and installation professionals, and the need for builders, developers, realtors and lenders and appraisers to value energy savings.

While these barriers present unique challenges that we must address, our No. 1 challenge is the high initial cost, primarily due to the installation of our underground loop. One strategy that is very

promising is on-bill financing, which allows residential and commercial energy-efficient projects to be financed directly on the utility bill.

The advantage of this approach is that the up-front costs are converted into small monthly payments that is more than offset by the monthly energy savings realized by the project. Several States, including Illinois and California, have initiated on-bill financing programs. Many utilities are reluctant to participate, though, because of the concerns of default risks and added complexity of administering the financing. Some utilities have turned to third-party financing programs as a solution, particularly in the residential market.

By creating a Federal program that would reduce financial exposure of utilities through a loan-loss fund, for example, I am confident that more utilities would implement on-bill financing programs. A Federal loan-loss backstop would offer utilities a major incentive that would not be very expensive. The default rate of on-bill financing programs is very low, and the loan is tied to the utility bill, and not the homeowner, and the loan would continue to be paid as long as the building is occupied.

If you are looking for a relatively inexpensive way to create jobs, improve energy efficiency to our homes and buildings, lower energy costs for consumers, and reduce greenhouse emissions, I can think of no better approach than encouraging more utility companies to offer on-bill financing for installing geothermal heat pumps.

By tackling the up-front cost, we expect our industry would rapidly expand and we would create thousands of new jobs. These are U.S.-based jobs in the manufacturing and drilling equipment and installation. We estimate that a new job would be created for every 18 heat pump system installations. That is a very conservative estimate. From my perspective, I would expect installations would more than double if we had a robust on-bill financing program. This would allow me to grow my work force by one-third, from 24 to 32 workers.

We will also drastically reduce emissions. On an average 20-year lifespan, the installation of 100,000 units of residential geothermal systems can reduce greenhouse gas emissions by almost 1.1 million metric tons, the equivalent of removing 58,700 cars from our roads or planting more than 120,000 acres of trees.

Thank you again for the opportunity to testify in your hearing.

[The prepared statement of Mr. Schoen follows:]

Testimony of Phil Schoen
Chief Executive Officer, GEO-Enterprises

On "Innovative Practices to Create Jobs and Reduce Pollution"

Before the

Subcommittee on Green Jobs and the New Economy

October 13, 2011

Good morning, I am Phil Schoen, CEO of GEO-Enterprises, an Oklahoma-based company founded in 1997 that specializes in the design and application of geothermal heating and cooling solutions. GEO-Enterprises has 24 employees, and our company provides a range of services from thermal conductivity testing and modeling to complete turnkey loop field installations for residential and commercial projects.

I am pleased to participate in today's hearing on behalf of GEO – the Geothermal Exchange Organization, a non-profit trade association representing the U.S. geothermal heat pump industry. I serve on the board of GEO and have worked in the industry for more than 30 years.

Before I offer some thoughts about innovative strategies that could expand our industry, lower energy costs for consumers, and reduce emissions, let me briefly describe how our technology works.

A geothermal heat pump is a 50-State, clean, renewable technology that uses solar energy naturally stored just beneath the earth's surface to heat and cool residential and commercial buildings and to provide hot water at rates 40 to 70 percent cheaper than conventional heating and cooling technologies.

While conventional furnaces and boilers burn a fuel to generate heat, geothermal heat pumps use minimal amounts of electricity to transfer heat between the earth and a building, allowing much higher efficiencies. The most efficient fuel-burning heater can reach efficiencies around 95 percent, but geothermal heat pumps operate at 400 percent efficiency.

Geothermal heat pumps use 25 to 50 percent less electricity than conventional heating or cooling systems, and according to the Environmental Protection Agency, they can reduce energy consumption – and corresponding emissions – by 44 to 72 percent compared to traditional heating and cooling equipment.

Despite this well-documented energy efficiency, our industry is still relatively small, with less than 5-percent market penetration for new construction. The primary barriers to expanding our industry include:

(1) high initial installation cost;
(2) lack of consumer awareness;
(3) the need for more qualified design and installation professionals; and
(4) the need for builders, developers, realtors, lenders, and appraisers to value energy savings.

While each of these barriers presents unique challenges that we must address, our number one challenge is the high initial installation cost, primarily due to the installation of the underground loop.

One strategy that is very promising is on-bill financing, which allows residential and commercial energy efficiency projects to be financed directly on the utility bill. The advantage of this approach is that the up-front costs are converted into a small monthly payment that is more than offset by the monthly energy savings realized by the project.

Several states, including Illinois and California, have initiated on-bill financing programs. But many utilities are reluctant to participate because of concerns about the default risk and the added complexity of administering the financing. Some utilities have turned to third-party financing programs as a solution, particularly in the residential market.

By creating a federal program that would reduce the financial exposure of the utilities – through a loan-loss fund for example – I am confident that more utilities would implement on-bill financing programs. A federal loan-loss backstop would offer utilities a major incentive and would not be very expensive. The default rate for on-bill financing programs is very low, and since the loan is tied to the utility bill and not the homeowner, the loan would continue to be paid as long as the building is occupied.

If you are looking for a relatively inexpensive way to create jobs, improve the energy efficiency of our homes and buildings, lower energy costs for consumers, and reduce greenhouse gas emissions, I can think of no better approach than encouraging more utility companies to offer on-bill financing programs for installing geothermal heat pumps.

By tackling the upfront cost issue, we expect our industry will rapidly expand and we will create thousands of new jobs. These are U.S.-based jobs – from the manufacturing to the drilling to the installation. We estimate that one new job will be created in this country for every additional 18 heat pump installations – and that is a very conservative estimate. From my perspective, I would expect that my installations would more than double if we had a robust on-bill financing program. This would allow me to grow my workforce by one-third – from 24 to 32 workers.

We will also dramatically reduce carbon emissions. Over an average 20-year lifespan, the installation of 100,000 units of residential geothermal systems can reduce greenhouse gas emissions by almost 1.1 million metric tons – the equivalent of removing 58,700 cars from our roads or planting more than 120,000 acres of trees.

Thank you again for the opportunity to testify at today's hearing.

QUESTION 1: Mr. Schoen, as your testimony mentions, my state of California allows utilities to finance energy efficiency improvements that customers, including for large institutional and industrial operations, pay back over time. Can you describe the benefits of this innovative financing and repayment program for these types of operations?

While I am not an expert in the California program, on-bill financing programs can be game changing for our industry. The largest barrier that limits the growth of our industry, in both the residential and commercial markets, is the significant upfront installation cost. On-bill financing allows energy efficiency projects to be financed directly on the utility bill, converting the upfront costs into a smaller monthly payment that is more than offset by the monthly energy savings realized by the project. We believe that the California program is a model that should be replicated across the country. We recognize that some utilities have concerns about the default risk and the added complexity of administering these programs. That is why we strongly support efforts at the federal level to provide utilities with incentives, such as a loan-loss backstop fund, to make on-bill financing more attractive. Focusing on improving the efficiency of our homes and buildings makes sense. Buildings dominate U.S. energy use and carbon emissions. It is estimated that buildings account for 39 percent of energy consumed in the U.S. and are responsible for 43 percent of carbon emissions. If we expand on-bill financing programs, we will create thousands of jobs, improve the energy efficiency of our homes and buildings, and dramatically reduce carbon emissions.

QUESTION 2: Mr. Schoen, do some utilities use third-party financing agreements to reduce the risk of default with some innovative financing and repayment programs? If so, can you please describe how these third-party agreements work and their overall benefit?

It is my understanding that some utilities rely on third-party lenders to help run their on-bill financing programs, but these programs are more common in the residential sector than the commercial sector. An advantage of third party financing is that utilities can avoid the added complexity of administering the program, including assessing credit risk and exposure to nonpayment. I believe these programs have merit and are worth exploring. Another model that should be considered is the Property Assessed Clean Energy Program (PACE), which California also adopted. Regardless of the approach, we are confident that by helping reduce the upfront costs, we will see a dramatic increase in the number of consumers and building managers that invest in energy efficiency initiatives. We strongly support an amendment recently adopted by the Senate to direct the Economic Development Administration to implement a pilot program to look at mechanisms to encourage more utilities to offer on-bill financing programs. Let's figure out what works and the lessons we can learn from existing programs and then put in place the right incentives to ensure that this funding mechanism is available to all homeowners and commercial building managers.

Senator SANDERS. Thank you very much, Mr. Schoen.

Dr. Anne Smith currently serves as Senior Vice President of NERA Economic Consulting. She is an economist and a specialist in environmental policy. Prior to joining NERA, she served as a practice leader in climate and sustainability at Charles River Associates; Vice President at Decision Focus, Incorporated; and served as economist for the Office of Policy Planning and Evaluation at the U.S. Environmental Protection Agency.

Dr. Smith, thanks for being with us.

STATEMENT OF ANNE SMITH, SENIOR VICE PRESIDENT, NERA ECONOMIC CONSULTING

Ms. SMITH. Thank you, Mr. Chairman, Members of the Committee. My name is Anne Smith and I am an economist and Senior Vice President at NERA Economic Consulting. My testimony is my own and does not represent the positions of my employer or any of its clients.

Today, I wish to summarize the results of a study in which my colleagues and I evaluated the combined economic impacts of four major environmental regulations now affecting the electric power sector.

EPA assesses the cost of these regulations individually, but we saw a gap in EPA's analysis because they failed to take into account the effects of how these four regulations interact when implemented simultaneously. This interaction may create cumulative impacts on business decisions that are different from the sum of the individual impacts that EPA estimates.

Also, we saw a need to better understand the interplay between so-called green jobs that would result from spending on environmental controls, and job losses from higher electricity and energy prices that can result from that same spending. We assessed the net job impact, taking into account both the positive and negative effects of jobs on different sectors of the economy.

The four environmental regulations that we analyzed in combination are, one, the final cross-State air pollution rule; two, the proposed utility MACT rule; three, the proposed coal combustion residuals regulations; and four, the proposed cooling water intake regulations.

Very soon, utility company executives will have to either invest large sums of money to install new pollution controls at their coal units or retire them. Retirements imply spending, too, to build new replacement capacity and increase costs for cleaner replacement generation.

Whether retirements are few or many, total spending will be large even using EPA's own technology cost assumptions, and electricity rates will have to raise paying for both forms of spending and for any fuel cost increases. Most replacement capacity is likely to be fired by natural gas, given today's realities in markets, technologies and policy, thus total unit retirements may put upward pressure on natural gas prices, even given the now-recognized abundance of potential domestic shale gas supplies.

Using U.S. Government assumptions, data and models, we developed estimates of the likely mix of types of spending in the next few years, given the anticipation of all four types of regulations

combined. We also assessed impacts on electricity rates and electricity prices. Then, using a well-established macroeconomic model, we assessed the overall impact on the U.S. economy of these many simultaneous changes in spending and rates.

And our key finding was that the net impact on jobs will be negative. On average, during the period 2012 to 2020, we do project at least 55,000 added green jobs. However, we also project that the increased costs of compliance with these four regulations reduced other jobs in other sectors by at least 238,000, four times as many. Most of those job losses occur in retail and other sectors that have no direct impact from these four regulations. The result is a net reduction of 183,000 jobs nationwide over that time period.

We also estimated that the four regulations would result in annual compliance costs of $21 billion per year, which includes $104 billion in capital spending, most of it for a very large number of retrofit controls.

Nevertheless, we also projected that natural gas prices would increase by about 11 percent on average over this period due to many coal units being replaced with natural gas-fired electricity supplies.

Given all these costs, nationwide average retail electricity prices are projected to increase by about 7 percent over the period, with the increase varying considerably by region. That is the average, the 7 percent. When billions are spent on investments in cleaner energy, somebody has to pay it back. When we also account for those repayments, we find these regulations cause a greater loss in jobs across the entire economy than the boost that they give to green jobs in some sectors of the economy.

Thank you for the opportunity to testify. I would be glad to answer any questions you might have.

[The prepared statement of Ms. Smith follows:]

Prepared Statement of
Anne E. Smith, Ph.D.
at a Hearing on
"Innovative Practices to Create Jobs and Reduce Pollution"
by the
Subcommittee on Green Jobs and the New Economy
Committee on Environment and Public Works
United States Senate
Washington, D.C.

October 13, 2011

Mr. Chairman and Members of the Committee:

Thank you for your invitation to participate in today's hearing. I am Anne E. Smith, and I am a Senior Vice President of NERA Economic Consulting. I am a specialist in the analysis and design of cost-effective policies, which was a core element of my Ph.D. thesis at Stanford University in economics. I have performed work in the area of air quality benefit-cost analysis and economic impact analysis over the past thirty years, including as an economist in the U.S. Environmental Protection Agency's Office of Policy, Planning, and Evaluation, as a consultant to the EPA's Air Office, and in many consulting engagements since then for government and private sector clients globally. I have also served as a member of several committees of the National Academy of Sciences focusing on management of risks from environmental contamination. I have analyzed costs, risks and benefits of many key U.S. air policies, including fine particulate matter, ozone, mercury and other air toxics, regional haze, NO2, SO2, and greenhouse gases.

The topic of today's hearing is the potential impacts on jobs of environmental regulations. I have analyzed the employment impacts of many different types of regulations over the years, but I would like to focus my testimony today on our recent analyses and research related to environmental regulations affecting the electric power sector. I am a co-author of a recent study that evaluated the cumulative energy and economic impacts of four major environmental regulations affecting the electric utility sector.[1] I thank you for the opportunity to share our findings. My written and oral testimonies reflect my own opinions and do not necessarily represent the position of NERA Economic Consulting or any of its clients.

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[1] Harrison, David, Andrew Foss, James Johndrow, Eugene Meehan, Bernard Reddy and Anne Smith, *Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations*, report prepared for American Coalition for Clean Coal Electricity, September 2011. http://www.americaspower.org/sites/default/files/NERA_Four_Rule_Report_Sept_21.pdf

Motivation for the Study: Fill a Gap in Information on the Cumulative Energy and Economic Impacts of Environmental Regulations

A key motivation for the study was to fill a gap in information on the combined energy and environmental impacts of environmental regulations. The U.S. Environmental Protection Agency (EPA) typically proposes regulations individually and provides estimates of each one's social costs and benefits (and other impacts) individually. That is, while EPA's analyses generally include previously-promulgated regulations in the baseline of its regulatory impact analyses, it does not usually consider the implications of other potential future regulations that are simultaneously under consideration. This can create a gap in the insights that the analysis can identify, particularly when there may be interactions between the new regulation in question and one or more other likely future regulations.

There has been concern with just such a gap in the understanding of the impacts of regulations presently facing the electricity generating sector of the U.S., of which there are quite a few, including the just-promulgated Cross-State Air Pollution Rule (CSAPR), the Electric Generating Unit MACT rule, and major regulations to address coal combustion residuals (CCR), and regulation of cooling water intake structures under Section 316(b) of the Clean Water Act. Each of these regulations increases future costs for coal-fired power plants, and they will inevitably – in combination – affect utility decision making about whether to keep retrofitting more controls, or to retire certain units. Thus, these regulations must be analyzed in a combined, or *cumulative*, manner in order to provide a credible assessment of their overall costs, energy market impacts, and macroeconomic impacts. Providing that missing cumulative assessment of the macroeconomic impacts of these four rules was the central purpose of our analysis.[2]

In addition, in recent years policymakers have taken interest in additional impact of environmental regulations that is not part of the classical analyses of benefits and costs that are included in regulatory analyses: "green jobs." Some studies have noted that environmental mandates will increase employment in pollution control and clean technology sectors.[3] However, other researchers, including myself, have noted that these results ignore the jobs lost in the rest of the economy due to other impacts of the

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[2] Several other studies have analyzed these rules, but have focused instead only on whether these regulations pose reliability concerns. These studies include the following: Bipartisan Policy Center. *Environmental Regulation and Electric System Reliability*. Washington, D.C.: 2011; Brattle Group. *Potential Coal Plant Retirements Under Emerging Environmental Regulations*. Cambridge, MA: 2010; Charles River Associates. *Prospects for an EPA-Driven Capital Crisis for Utilities*. Boston, MA: 2010; Edison Electric Institute. *Potential Impacts of Environmental Regulation on the U.S. Generation Fleet*. Report prepared by ICF International. Washington, D.C.: 2011; ICF International. *Clean Air, Ash and Water Regulations: Potential Impact of EPA Proposed Rules*. Fairfax, VA: 2010; M.J. Bradley & Associates and Analysis Group. *Ensuring a Clean, Modern Electric Generating Fleet while Maintaining Electric System Reliability*. Concord, MA: 2011; and North American Electric Reliability Corporation. *Special Reliability Scenario Assessment: Resource Adequacy Impacts of Potential U.S. Environmental Regulations*. Princeton: 2010.

[3] See Ceres. *New Jobs—Cleaner Air: Employment Effects Under Planned Changes to the EPA's Air Pollution Rules*. Report prepared by the University of Massachusetts Political Economy Research Institute. Boston: February 2011.

regulations, including increased electricity and other energy prices.[4,5] Our recent analysis also sheds light on the mix of job impacts from these regulations, including the potential increase in "green jobs" and the net impacts on jobs in general.

Objectives and Methodology of the Study

Our study develops a set of models to evaluate the potential effects of certain environmental regulations on energy markets and economic activity. This methodology thus complements those that have been developed to estimate the costs and benefits—and other impacts—of individual regulations.

Specifically, our study provides projected effects over the period from 2012 to 2020 of four environmental regulations affecting the electric utility sector—the final Cross-State Air Pollution Rule (CSAPR) and proposed regulations for Utility MACT), coal combustion residuals (CCR), and regulation of cooling water intake structures under Section 316(b) of the Clean Water Act—in three major areas:

1. *Coal unit retirements and retrofits.* These are estimates of the effects of potential total retrofit costs on the decisions regarding coal unit retirements.

2. *Electricity and other energy market impacts.* These impacts include the potential effects on energy markets—including coal, natural gas, and electricity—as well the increased technologies to achieve compliance and overall compliance costs.

3. *Economic impacts.* These effects include impacts on the U.S. economy, including employment, gross domestic product (GDP), and disposable personal income (i.e., personal income after taxes).

The modeling framework begins with a set of detailed estimates of the likely compliance technologies—and the costs of retrofitting them—associated with the individual regulations. These assessments are based upon the requirements of the individual regulations, including taking into account the potential flexibility provided under CSAPR.[6] For the CCR and Section 316(b) regulations, we use EPA estimates of retrofit costs for the various affected units. The result is a set of estimates of the potential technologies and costs to individual electricity generating units under the four policies.

The next task is to estimate the effects of these projected costs on future retirements of coal-fired power plants. The retirement model we develop is a Monte Carlo uncertainty

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[4] Smith, Anne E. "CRA Analyses of Federal Bills," presented at Nicholas Institute for Environmental Policy Solutions Workshop on Estimating Employment Impacts of Energy and Environmental Policy: Lessons Learned and Future Directions, October 8, 2010 (http://nicholasinstitute.duke.edu/envenergy).

[5] Montgomery, W. David. Prepared Testimony of W. David Montgomery, Ph.D., before the Senate Committee on Environment and Public Works, Subcommittee on Green Jobs and the New Economy. February 15, 2011.

[6] The implications of the emissions trading provisions of CSAPR for technology choices at individual units are developed through an initial run of the NEMS model (a model that is described in the text).

model designed to predict potential economic retirements based upon comparisons of the future costs of the coal-fired unit in comparison to the costs of the likely new generation that would be added in the future. The model incorporates uncertainties in key parameters affecting this comparison, including control costs and electricity and fuel (notably natural gas) prices; the model also takes account of the feedback effects of coal unit retirements on electricity and fuel prices.

The estimated coal unit retirements and the estimated compliance costs for non-retiring units are then input to the U.S. Department of Energy's National Energy Model System (NEMS) model, a well-established modeling framework used by the Energy Information Administration (EIA) to evaluate energy and environmental policies. To develop estimates of changes in employment and other economic impacts, the NEMS results are input to the Policy Insight Plus model developed by Regional Economic Models, Inc. ("REMI PI+"), a model used extensively by numerous government agencies and private groups to assess the economic impacts of public and private policies.

Although we have attempted to develop comprehensive assessments, the results should be viewed as subject to uncertainties beyond those incorporated in the analyses. Projected coal unit retirements, for example, do not include the effects of other potential regulatory requirements—for example, those related to greenhouse gases—and the impacts do not include potential effects of coal unit retirements on (or constraints related to) electricity system reliability. These omitted factors could lead to additional impacts beyond those projected in this study.

Overview of Study Results

I summarize the results of the study in the three major areas noted above.

1. Coal Unit Retirements and Remaining Retrofit Requirements

The potential retrofit costs of the four policies, when considered from a cumulative perspective, are estimated to lead to 39 gigawatts (GW) of prematurely retired capacity by 2015 among the current coal-fired power plants. This estimate represents additional retirements above those in the reference case (i.e., retirements predicted without the four regulations in place) and accounts for about 12 percent of the 2010 U.S. coal-fired electricity generating capacity.[7] As noted, this projection does not include the potential effects of other requirements or concerns related to detailed electricity system reliability.

The retrofit control technologies that would need to be put in place in order for non-retiring units to comply with the four environmental regulations are large. In comparison to the reference case, we estimate that the following additional controls would need to be put in place to meet the two air emission regulations: 13 GW of wet scrubbers, 53 GW of

[7] This level of retirements is estimated in the retirement model and is not influenced by utility retirement announcements.

dry scrubbers, 13 GW of selective catalytic reduction (SCR), 171 GW of activated carbon injection (ACI), 163 GW of fabric filters, and 12 GW of dry sorbent injection (DSI). These estimates of the amount of capacity that will need to be retrofitted after accounting for units projected to retire instead have accounted for the flexibility provided in the regulations. Our estimates of the costs of these retrofits are based upon the costs that EPA has developed for the various technologies.

Our energy and economic impact analyses assume that all of these retrofits and retirements can be effectuated by 2015, and that the costs would not increase to response to difficulties that might be encountered in installing these technologies in such a limited time frame. We believe there is a risk that his tight timetable for retrofits cannot realistically be met, but we have not performed the requisite studies to assess what rate of combined retrofitting and retirements is viable. We do note, however, that if our assumption that all of these changes can occur during this brief period of time is unrealistic, then the energy and economic impacts of the regulations will be greater than projected in our analyses, as summarized below (assuming the regulations will be imposed on their currently proposed schedules).

2. Energy Market Effects

As noted, the energy market impacts of the various regulations were estimated using the National Energy Modeling System (NEMS) model based on estimates of the coal units that retire and the compliance costs for units that do not retire. The NEMS output includes estimates of overall compliance costs for the electric sector, as well as detailed impacts on energy markets. Table 1 summarizes the potential costs for the electricity sector based on the level of coal retirements predicted in the retirement model. These costs include compliance costs for coal units that do not retire, capital costs for new capacity that would replace retiring coal units, and changes in fuel costs. Costs are projected to be approximately $21 billion (in 2010$) per year over the period from 2012 to 2020. The costs represent a total of $127 billion (present value in 2010$ as of January 1, 2011) over the period from 2012 to 2020. Capital costs for environmental controls and replacement capacity are about $104 billion.[8]

The retirement of coal units and construction of replacement capacity affect electricity sector fuel consumption, fuel prices, and electricity prices. Table 2 summarizes the average potential energy market effects of the four regulations from 2012 to 2020. The report provides information on the annual effects for 2012-2020, with effects that are both higher and lower than these average values.

[8] Capital costs exceed the total for environmental controls and replacement capacity because of net reductions in operating and maintenance costs.

Table 1. Electricity Sector Costs, 2012-2020 (billion 2010$)

	Annual Avg	PV
Environmental Controls	$15	$89
Replacement Capacity	$2	$11
Fuel	$5	$28
Total	$21	$127

Note: Compliance costs from 2012 through 2020 are discounted to January 1, 2011 using a real annual discount rate of 7 percent.
Annual average costs are based on the present values and discounting.
The cost of environmental controls includes net cost savings for operating and maintenance (O&M) expenses.

Source: Table ES-1 in Harrison, David, Andrew Foss, James Johndrow, Eugene Meehan, Bernard Reddy and Anne Smith, *Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations*, report prepared for American Coalition for Clean Coal Electricity, September 2011.

Table 2. Average Annual Energy Market Impacts, 2012-2020

	Coal Retirements	Coal-Fired Generation	Coal Price at Minemouth	Gas-Fired Generation	Gas Price at Henry Hub	Avg Retail Elec Price
	(GW)	(million MWh)	(2010$/ton)	(million MWh)	(2010$/MMBtu)	(2010$/MWh)
	Average of 2012-2020 Projections					
Reference	3.1	1,911	$33.54	639	$4.48	$86.87
CSAPR+MACT+CCR+316(b)	42.2	1,699	$31.61	765	$4.95	$92.52
	Change from Average of 2012-2020 Reference Projections					
CSAPR+MACT+CCR+316(b)	+39.1	-212	-$1.93	+126	+$0.48	+$5.65
	% Change from Average of 2012-2020 Reference Projections					
CSAPR+MACT+CCR+316(b)	+1241%	-11.1%	-5.7%	+19.7%	+10.7%	+6.5%

Note: Coal retirements are cumulative from 2010 through 2020.

Source: Table ES-2 in Harrison, David, Andrew Foss, James Johndrow, Eugene Meehan, Bernard Reddy and Anne Smith, *Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations*, report prepared for American Coalition for Clean Coal Electricity, September 2011.

Coal-fired generation is projected to decrease by an average of 11.1 percent over the period from 2012 to 2020. The reduction in coal demand is projected to decrease coal prices by 5.7 percent on average. In contrast, the regulations are predicted to increase natural gas-fired generation by 19.7 percent on average over the period and increase Henry Hub natural gas prices by 10.7 percent on average. The increases in natural gas prices would lead to an estimated average increase in costs of about $8 billion per year for residential, commercial and industrial natural gas consumers, which translates into an increase of $52 billion over the 2012-2020 period (present value in 2010$ as of 2011 discounted at 7 percent). Average U.S. retail electricity prices are projected to increase by an average of 6.5 percent over the period.

3. Economic Impacts

The potential economic impacts of the four policies were estimated using the REMI PI+ model. Table 3 summarizes the potential economic impacts. The table shows both the average annual changes over the period from 2012 to 2020, as well as the cumulative effects over the same time period. These net figures take into account jobs that would be created in some sectors as a result of spending on pollution controls (i.e., "green jobs"), as well as jobs lost due to higher electricity prices and other negative impacts. The sectors that gain are dominated by several sectors that tend to gain direct employment as a result of pollution control spending—notably machinery manufacturing and construction—and by the natural gas sector that gains from increased demand for its output on the part of the electricity sector. The sectors that lose employment include mining, reflecting the decreased demand for coal. But the bulk of the job losses are accounted for by retail trade and the many other sectors that are indirectly affected by the regulations as a result of the effects of higher electricity and natural gas prices on consumer demand and U.S. industrial competitiveness—not by the sectors such as utilities and mining that are directly affected.

Table 3. U.S. Economic Impacts, 2012-2020

	Annual Average	Cumulative
Employment	-183,000 jobs	-1.65 million job-years
Gross Domestic Product	-$29 billion	-$190 billion
Disposable Personal Income	-$34 billion	-$222 billion
Disposable Personal Income per Household	-$270	-$1,750

Note: All dollar values are in 2010$.
The cumulative employment impact is an undiscounted sum from 2012 to 2020; the cumulative GDP and disposable personal income impacts are present values as of January 1, 2011 using a real annual discount rate of 7 percent.
Disposable personal income impacts per capita from REMI were converted to disposable personal income impacts per household based on a current average U.S. household size of 2.58 people (Census 2011).

Source: Table ES-3 in Harrison, David, Andrew Foss, James Johndrow, Eugene Meehan, Bernard Reddy and Anne Smith, *Potential Impacts of EPA Air, Coal Combustion Residuals, and Cooling Water Regulations*, report prepared for American Coalition for Clean Coal Electricity, September 2011. *Cleancoalusa.org*

Over the period from 2012 to 2020, about 183,000 jobs per year are projected to be lost on net due to the effects of the four regulations. The cumulative effects mean that over the period from 2012 to 2020, about 1.65 million job-years of employment would be lost. As noted, these net employment losses reflect net gains in some sectors and net losses in others. Of the 70 sectors in the REMI PI+ model, sectors that would gain jobs (primarily machinery manufacturing, construction and oil and gas) account for about 55,000 added jobs per year on average, and sectors that would lose jobs (represented by retail trade and the vast bulk of the other services sectors) account for about 238,000 fewer jobs per year on average. On a cumulative basis over the period from 2012 to 2020, the sectors that would gain jobs represent about 499,000 job-years, and the sectors that would lose jobs represent about 2,149,000 job-years.

Table 3 also shows the potential near- to medium-term impacts on GDP and disposable personal income. U.S. GDP would be reduced by $29 billion each year on average over the period, with a cumulative loss from 2012 to 2020 of $190 billion (2010$). U.S. disposable personal income would be reduced by $34 billion each year on average over the period, with a cumulative loss from 2012 to 2020 of $222 billion (2010$). The average annual loss in disposable personal income per household is $270, with a cumulative present value loss of about $1,750 (2010$) over the period from 2012 to 2020. Annual economic impacts from 2012 to 2020 are provided in the report.

Summary

My testimony has focused on the potential cumulative impacts on the U.S. energy system and the U.S. economy of four major environmental regulations over the period from 2012 to 2020. A key feature of our assessment is its comprehensiveness—we include the positive effects on the economy of increased demand for pollution control equipment (so called "green jobs") and natural gas, as well as the negative effects on the economy of higher energy prices and the need to finance increased expenditures. Our results indicate that these four regulations would have substantial impacts on the energy sector and that the net economic impacts would be negative.

Senator SANDERS. Thank you, Dr. Smith.

Mr. Steve Rowlan currently serves as the Director of Energy and Environment at Nucor Corporation. He joined Nucor almost 20 years to lend his expertise in engineering to all aspects of environmental affairs and energy utilization. Mr. Rowlan sits on the Board of Managers for PIZO Technologies North America and has chaired both the Steel Manufacturers Association and the American Iron and Steel Institute Environment Committees.

Thanks for being with us, Mr. Rowlan.

STATEMENT OF STEVEN ROWLAN, GENERAL MANAGER, ENVIRONMENT, NUCOR CORPORATION

Mr. ROWLAN. Thank you, Chairman Sanders and Ranking Member Boozman for the invitation to testify today regarding the significant impact energy policies and proposed EPA regulations have on job creation and electricity costs.

Nucor is the largest steel producer and recycler in the United States. We employ over 20,000 teammates in 23 States. The steel industry, like many industries in this Country, was significantly impacted by the Great Recession. Steel capacity utilization dropped from 90 percent to 36 percent in a matter of a few months at the end of 2008.

Despite how bad the market got, Nucor did not lay off a single worker. Economic conditions have improved for the steel industry, but the continued weakness in the economy is very concerning. On top of this economic uncertainty and persistently high unemployment is a rash of new and proposed regulations by the EPA, including ozone standards, utility MACT, cross-State air pollution rule, and the greenhouse gas emissions rules.

This regulatory uncertainty and the threat of significantly increased costs are holding back capital investment and the jobs that investment would create. The impact is real. We recently received a permit under the new greenhouse gas rules for a direct reduced iron facility in Louisiana. This is a $750 million project that will create 500 construction jobs and 150 permanent manufacturing jobs. It is a great job-creating investment, particularly in this economy. But this project is not as large as the $2 billion investment we initially intended.

Due to the uncertainty created by these regulations, we made the difficult decision to delay the $2 billion investment, also delaying the creation of 2,000 construction jobs and 500 permanent manufacturing jobs. This is one example, but we should also be concerned with the examples we cannot cite.

The reality is that because of burdensome permitting requirements and rising energy costs, increasingly industrial projects are no longer even being considered for development in the United States. The additional regulations EPA is considering will only continue and intensify that trend.

The other threat these regulations pose is to energy prices. Economical and abundant energy supplies are the lifeblood of industry. These new and proposed regulations put these at risk. Energy must be priced at a level that will allow energy-intensive industries to be competitive with international producers of their products. Because energy is perceived as being cheap, since it costs just pen-

nies per kilowatt hour, we fail to understand the full impact energy costs have on profitability.

You will often hear that a proposed regulation will only cost a few cents per kilowatt hour. That is a true, but very misleading statement. If industry is paying only five cents per kilowatt hour, for example, for electricity and the price increases by one cent, that is a 20 percent increase in energy costs. For homeowners paying approximately 10 cents, that is a 10 percent increase. These increases, coupled with other regulations that will force the closure of coal-fired electrical generation facilities will result in lower supply, with further upward pressure on prices.

The impact of these seemingly small increases on industry is staggering. At Nucor, we use electric arc furnaces to recycle over 20 million tons of scrap metal annually into usable steel products. For Nucor, a one cent increase in electricity costs translates into a cost increase of more than $120 million per year. The question is: Where will that money come from?

And increase like that leaves industry with few good options. The steel industry has reduced the energy intensity required to produce a ton of steel by 30 percent since 1990. We did this to remain competitive in a global market. At the end of the day, any energy cost increases stop with us. We do not have the luxury of passing these costs along.

As a large consumer of natural gas, we are also concerned that as gas replaces coal, our natural gas costs will increase. On top of fuel-switching, the EPA is also attempting to expand its regulatory authority to include hydraulic fracking. We risk under-developing this important domestic resource by strangling it in regulations.

We have seen in recent weeks the peril of creating green energy in defiance of basic market fundamentals. In many mature industries like steel, technological innovation and markets are driving increased energy efficiency, greater recycling and lower emissions. These jobs may not fit the conventional wisdom of what constitutes a green job, but they are good-paying and hopefully long-lasting blue collar jobs that are using innovation to become cleaner, more efficient and reduce environmental impact.

These are the kinds of jobs we need to be creating, not eliminating, in pursuit of mandating a green economy on industry.

[The prepared statement of Mr. Rowlan follows:]

Testimony of Steve Rowlan
General Manager of Environmental Affairs
Nucor Corporation
Hearing on Innovative Practices to Create Jobs & Reduce Pollution
Subcommittee on Green Jobs & the New Economy
United States Senate
October 13, 2011

I am Steven Rowlan, General Manager of Environmental Affairs for Nucor Corporation. Thank you, Chairman Sanders and Ranking Member Boozman for the invitation to testify today regarding the impact energy policies and proposed EPA regulations have on job creation and electricity costs. Unfortunately, current regulatory proposals and the push for green energy is stifling job creation and threaten to significantly increase energy costs, jeopardizing U.S. manufacturing.

Nucor is the largest steel producer and recycler in the U.S. We employ over 20,000 teammates in 23 states and produce steel products for use in roads, bridges, automobiles, appliances, commercial buildings and a range of other markets.

The steel industry, like many industries in this country, was significantly impacted by the Great Recession. Steel capacity utilization dropped from 90 percent to 36 percent in a matter of a few months at the end of 2008. Despite how bad the market got, Nucor did not lay off a single worker. Economic conditions have improved for the steel industry, but the continued weakness in the economy is very concerning.

On top of this economic uncertainty and persistently high unemployment is a rash of new and proposed regulations by the EPA, including ozone standards, utility MACT, the cross-state air pollution rule and greenhouse gas emissions standards. This regulatory uncertainty and the threat of significantly increased costs are holding back capital investment and the jobs that investment would create.

The impact is real. We recently received a permit, under the new greenhouse gas rules for a direct reduced iron facility in Louisiana. This is a $750 million project that will create 500 construction jobs and 150 permanent manufacturing jobs. It is a great job-creating investment, particularly in this economy. But this project is not as large as the $2 billion investment we initially intended. Due to the uncertainty created by these new regulations, we made the difficult decision to delay the $2 billion investment, also delaying the creation of 2,000 construction jobs and 500 permanent manufacturing jobs.

This is one example, but we should also be concerned by the examples we cannot cite. The reality is that because of burdensome permitting requirements and rising energy costs, increasingly industrial projects are no longer even being considered for development in the United States. U.S. locations are typically passed over during the initial evaluation and consequently are never even considered for projects unless all other options fall through. The additional regulations EPA is considering will only continue and intensify that trend.
The other threat that these regulations pose is to energy prices. Economical and abundant energy

supplies are the lifeblood of industry. These new and proposed regulations risk increasing energy prices and lowering energy supply.

Energy must be priced at a level that energy-intensive industries can consume it while making a product that they will then be able to sell for a profit. Because energy is perceived as being "cheap," since it costs just pennies per kilowatt hour, we fail to understand the full impact energy costs have on profitability.

You will often hear that a proposed regulation will only cost a few cents per kilowatt hour. That is a true but very misleading statement. If industry is paying only 5 cents per kilowatt hour for electricity and the price increases by 1 cent, that is a 20 percent increase in energy costs. For homeowners paying around 10 cents, that is a 10 percent increase. These increases, coupled with other regulations that will force the closure of coal-fired electrical generation facilities, will result in lower supply with further upward pressure on prices.

The impact of these seemingly small increases on industry is staggering. At Nucor, we use electric arc furnaces to recycle over 20 million tons of scrap metal annually into usable steel products. For Nucor, a 1 cent increase in electricity costs translates into a cost increase of more than $120 million dollars per year. The question is, where will the money come from?

An increase like that leaves industry with few good options. We might be able to spend valuable capital to increase efficiency in hopes of offsetting the cost increase, but as a large energy user we already have plenty of incentive to do energy efficiency projects that generate a decent return. The steel industry has reduced the energy intensity required to produce a ton of steel by 30 percent since 1990. We could increase the cost of goods sold to maintain our margin, but in an international market, we will lose market share to competitors in other countries that do not have these energy cost increases. Finally, we can absorb the cost increase and decrease our profitability, but the result of that is potential job loss, contracting markets and lost tax revenue.

We are also a large consumer of natural gas. In recent years, we have seen natural gas-fired power plants built instead of new coal generation. Power companies have indicated that these new regulations will result in the closure of many coal-fired power plants. Fortunately, technological innovation has opened up vast amounts of natural gas reserves in this country. But regulations threaten this energy source as well. EPA is attempting to expand its regulatory authority to include hydraulic fracturing. We risk under developing this important domestic resource by strangling it in regulations. If these proposed air regulations encourage fuel switching, while regulations on hydraulic fracturing discourage natural gas production, it will drive up natural gas costs for industrial consumers.

We have seen in recent weeks the perils of creating "green energy" in defiance of basic market fundamentals. In many mature industries like steel, technological innovation and markets are driving increased energy efficiency, greater recycling and lower emissions. These jobs may not fit the conventional wisdom of what constitutes a "green job," but they are good-paying and hopefully long-lasting blue-collar jobs that are using innovation to become cleaner, more efficient and reduce environmental impact. These are the kind of jobs we need to be creating, not eliminating in the pursuit of mandating a green economy on industry.

1. Mr. Rowlan, you mention the difficulty in raising prices in an international marketplace. Can you elaborate further on the role that energy efficiency projects, undertaken to date by Nucor, have played in maintaining Nucor's ability to compete against foreign manufacturers in the steel industry?

   Nucor has pioneered many projects such as thin slab casting, strip casting, various EAF innovations and other projects that continually give us the ability to lower our costs of production, increase our efficiencies, and improve our quality. We implement these projects based upon their ability to provide us with a return on the investment of capital that is required. When we increase our margins or improve our quality, we also have the opportunity to expand our markets. When this happens, we are growing; and this is because we are more competitive. Our foreign competitors must then follow our lead and make improvements or give up market share. The inverse of this is when our costs are increased by government regulation. When this happens, we are simply struggling to maintain, and consequently, are not growing. Our competitors do not need to improve themselves because we are inflicting damage on ourselves; and they are simply waiting to take advantage of the situation.

2. According to your website, the steel industry has nearly fully achieved the energy efficiency and emission reduction possible using today's best technology. Can you describe the decision-making process Nucor generally undertakes before deciding to move forward on an energy efficiency project? What are the most important criteria Nucor uses in determining if it should start a project?

   The U.S. iron and steel sector has outperformed all other sectors in reducing their carbon footprint while maintaining a presence in the United States. Since 1990 our GHG emissions have dropped nearly 30% while we have maintained or increased slightly our production of steel in the United States. This has been done by implementing myriads of small and large projects that improve quality and efficiency. As previously noted, these projects then allow the industry to expand its markets. There are, however, theoretical limits to how efficient a process can become. A good example of this would be that it seems logical to use the electric arc furnace (EAF) technology to recycle steel in quantities sufficient to meet all domestic demand, which would further reduce GHG and other impacts. This cannot, however, happen because there is not enough scrap metal produced in the United States to provide recycled steel for all domestic consumption. We are limited by the amount of scrap metal that is produced and must, therefore, produce some percentage of steel from virgin materials. Without these virgin materials being used to produce new steel, the amount of scrap generated in the future would likely also fall further. In theory this sounds wonderful and effective; in practice it is impossible.

3. With the impending suite of regulations called the "train wreck" can you describe the difference in projects Nucor may have to take to remain competitive and the return you expect those projects to generate (positive or negative). Would these projects be undertaken without the regulations?

   As noted in the preamble example, the "train wreck" will increase energy prices significantly, and consequently, have a very negative impact on Nucor. Some unknowingly believe that the regulations somehow make efficiency projects with marginal returns become projects with acceptable returns. As pointed out in the preamble, the only reason these projects have a return is because of the cost avoidance related to the regulation. A cost avoidance return does not improve margin or marketability it usually maintains the market position that was disrupted by the regulation. Without regulations these projects do not have enough of an economic return to typically justify their implementation. Even with the regulation, the net impact of the project after increased regulatory cost avoidance has been removed is marginal at best. This is why the project was not implemented in the first place.

4. Can you further elaborate on the role of energy prices in Nucor's operations and, given that prices cannot be raised on the commodity you manufacture, provide a high-level description of the sources for funds to make up the higher cost of electricity you will face?

   Nucor is an energy intensive industry. Nucor is also the largest recycler in North America. To recycle steel we use tremendous amounts of electrical and natural gas energy. While a one-cent per kilowatt hour price increase sounds like a small amount, it will cost Nucor well over $100,000,000 per year in additional energy costs. If the price of steel on the open market remains the same because other countries do not have to absorb higher energy costs, Nucor is forced to pay these increased energy costs through reduced profitability. The irony in this situation is that if energy prices are increased in order to have "greener" energy, the higher prices will have an extremely negative impact on a very "green" industry—namely, Nucor and the steel recycling industry. To further exacerbate the problem, if the steel is not recycled in the United States because of high-priced energy, the emissions for the manufacturing of the steel will be exported to another country with economical energy prices. These countries will also have less restrictive emissions regulations; and consequently, the global emissions from the manufacturing of steel will increase; the amount of energy consumed globally to recycle steel will also likely increase; and finally, the United States will have exported its steel making industry and the associated jobs to another country in return for no global environmental benefit.

5. Energy intensive industries have long expressed concern with regulations that increase input costs due to the effect it has on their ability to compete internationally. In the context of the cap and trade debates, it was a major concern for manufacturers. But the effect of the EPA regulations we're now facing is the same: manufacturers will face higher costs that will undermine their ability to compete. Wouldn't you agree?

There is no doubt, and I wholeheartedly agree, that these regulations are intended to increase the price of energy, which was one of the main drivers in the cap and trade legislation. It is also true that energy intensive industries were effectively offered all of the allowances they would need in order to keep operating. The problem was not the operating allowances. The problem was the indirect impacts that the industries would have to absorb when the price of energy began to climb. This was also evidenced by the fact that the utility sector was given allowances to sell in order to subsidize energy for the poor. It was widely recognized that the cap and trade would have a very negative impact on residential energy consumers; and large volumes of allowances were set aside to soften this impact. This is also very evident today as airlines are objecting to the cost of flying into the EU because they are being charged for the emissions from their planes. This is having the effect of making flying in Europe more expensive than in other parts of the world.

6. Do you think energy efficient projects are adequate to ameliorate the effects of EPA regulations known as the "train wreck" in terms of manufacturing jobs?

   I do not think that energy efficiency projects will be able to ameliorate the effects of the regulations. The fact of the matter as pointed out in the preamble is that these projects are "make work" projects in reality because they are only viable because of the regulations impact. Capital properly allocated goes to projects that have definitive returns that foster market expansion and profitability. Regulatory avoidance projects that require capital take capital away from these projects and produce only cost avoidance returns that do not expand markets or profitability. They in fact usually lower profitability because more capital is invested to maintain the same margins that were previously obtained with less capital invested before the regulation. By diverting capital from better uses, the jobs that this capital might have created are lost in favor of avoiding a regulatory cost.

Thank you, Mr. Aronchick, for the opportunity to respond to Senator Inhofe's request. Should you have any questions regarding my responses listed above, I may be contacted at 704-367-8685 or srowlan@nucor.com.

Sincerely,

NUCOR CORPORATION

Steven J. Rowlan/bg

Steven J. Rowlan
General Manager, Environmental Affairs

Senator SANDERS. Mr. Rowlan, thanks very much.

Let me begin with the questioning, and then we will go to Senator Boozman and Senator Boxer.

Let me start with Phil Schoen. Mr. Schoen, last year, I held a town meeting in Vermont on geothermal, and I was surprised. We had hundreds of people coming out. What you are suggesting, if I understand you correctly, is there is real potential there and you are just beginning to tap it, and you are seeing as a major obstacle the fact that geothermal heat pumps are a fairly expensive proposition and people don't have the capital to make that investment.

All right. Answer two questions, if you might. No. 1, what do you see the potential of geothermal heat pumps in this Country? What kind of significance will it have? And No. 2, what role do you see the government playing in helping make that happen?

Mr. SCHOEN. Thank you for that question. My response is that in the lower housing, in the areas of lower housing, our technology is more expensive because when we install this heat exchanger, which by the way is 100-year life product, it has initial first cost. The good news is you can't export drilling or excavating.

Senator SANDERS. Let me ask you this. In practical terms, I am a homeowner or contemplating a new home in the State of Vermont, what is it going to cost me? What are my savings, et cetera, roughly?

Mr. SCHOEN. In a new home in Vermont, you might expect to pay $15,000 to have a system put in in a conventional sense. This product would probably cost $27,000, something like that, or an additional 50 percent cost increase to put in the heat exchanger. The inside machinery is the same, but it is 100-year life. And when you look at lower-cost housing, that is people with less means to pay for housing, where a dollar they save has much bigger impact, they don't have the resources to go to some of the conventional routes, and that is the big expansion of the marketplace.

Senator SANDERS. You mentioned in your testimony that geothermal was a 50-State proposition.

Mr. SCHOEN. Yes, sir.

Senator SANDERS. You see the application for geothermal all over the Country.

Mr. SCHOEN. Yes, sir. We have put in geothermal in Alaska. We have put in geothermal in Barbados. And so it spans all the areas of this Country and it almost has an application everyplace.

Senator SANDERS. And what kind of savings? I know this is average.

Mr. SCHOEN. An example would be in the State of Arkansas, when we did Farm Home Administration homes, we were able to achieve $1 a day for the utility costs of heating and cooling a home; $1 a day.

Senator SANDERS. So you are saving people $360 a year in their heating.

Mr. SCHOEN. Yes.

Senator SANDERS. OK. That is not insignificant.

All right, let me ask either Mr. White or Mr. Kempf, tell me what you see the potential of on-bill financing to be if we were making capital available to those businesses, municipalities, home-

owners who wanted to move aggressively in energy efficiency or sustainable energy? What do you see the potential out there?

Why don't you start, Mr. White?

Mr. WHITE. Sure. Great question. One of the things that we have seen in the States where we already offer it is customers having the ability to move forward with these projects that they otherwise wouldn't normally do. So they are worried about running their florist shop or their hotel or their small business. They just want the ease of implementation.

So the vendor comes in, offers up the project, shows them what their savings could be, and it is as simple as paying a line item on the bill.

Senator SANDERS. What might a typical, I am a slow business person, I have a shop, what might a typical savings be?

Mr. WHITE. It is thousands of dollars each year that they will save going forward. It is kind of hard to answer the question directly because it depends on the size of the project. But we have some projects where the payback is less than a year or less than 2 years, within that range. So it is very much a great proposition for a lot of our small businesses.

Senator SANDERS. Mr. Kempf, would you take a shot at that question, please?

Mr. KEMPF. One of the benefits also is that a lot of small business owners are rightly wary of independent energy auditors. And the on-bill financing has the added benefit that it is the utility approving contractors for coming in and doing it, so they accept the audit more willingly and proceed.

Senator SANDERS. You mentioned, I think, Mr. Kempf in your testimony that almost by definition, the contractors are themselves small business people.

Mr. KEMPF. Yes, by and large, the entire industry which does these sorts of things are small.

Senator SANDERS. So these are people who come in with weatherization efforts, with new lighting.

All right, my last question for Mr. White or Mr. Kempf, talk about lighting a little bit. What is the potential that you see? Are there savings in transiting to more energy-efficient lighting?

Mr. WHITE. Yes, and that is an area where we see the technology advancing quite significantly. And a lot of folks care about LED lighting. You can get it for your homes, your businesses.

As we have gone in and installed, in the project I mentioned with the hotel, their payback is going to be a little over a year and their annual cost savings for those 1,900 LED bulbs is around $222,000 for annual savings. So think about that big hotel and all the savings they are going to get from that technology, that lighting technology.

Senator SANDERS. And they are happy with the quality of the lighting?

Mr. WHITE. They are. They are.

Senator SANDERS. OK.

Senator Boozman.

Senator BOXER. Thank you.

Let me thank Senator Boozman for this courtesy. I have a meeting about the highway bill, so I wanted to make sure I could get there and do this.

I would like to put into the record this terrific, part of this document which is The On-Bill Financing: Helping Small Business Reduce Emissions and Energy Use While Improving Profitability. This is a document by the National Small Business Association echoing everything that you said, Mr. Chairman, and everything that you three have said, and everybody says they are for small business.

So I want to put in the executive summary into the record without objection, if that is OK, Mr. Chairman.

Senator SANDERS. Without objection.

[The referenced document was not recieved at the time of print.]

Senator BOXER. OK.

I was a little taken aback by Ms. Smith's testimony because she really didn't address the issue at hand. But Ms. Smith, you said you were speaking for yourself, yet you really were quoting from a report, were you not? Because you kept saying we found, we examined four rules. Is that correct?

Ms. SMITH. I am speaking for myself today, but you are quoting co-authors on the report that I collaborated with.

Senator BOXER. Yes, and here is the report. We have it here. And so this is essentially a coal company report and I would ask unanimous consent to put in the record the names of the companies and how much they contributed to the report that you have cited, if I might put that in the record.

Senator SANDERS. Without objection.

[The referenced document was not recieved at the time of print.]

Senator BOXER. Which is all fine, but everything you said and also the gist of Mr. Rowlan's testimony is refuted in this report. I would love you to read it. It is a special staff report, says a strong EPA protects our health and promotes economic growth. And I am going to quote from it in a bit.

But one thing that, Mr. Rowlan, you didn't talk about which is something terrific that has gone on in your business that we got from your webpage does fit into this hearing. It is Nucor has developed a manufacturing process that increases energy efficiency and reduces carbon pollution, and it is very exciting. You say that these mills consume 84 percent less energy than a conventional mill with a 75 percent reduction in greenhouse gases. That is in your Crawfordsville, Indiana and Blytheville, Arkansas facilities.

So I just wanted to thank you, even though you didn't talk about that, something that I think we should take note of. It is very exciting that you, too, in that you are continuing, even though you are opposing new regulations. You are moving to energy efficiency. And I think that is an important point.

Energy efficiency is something that should get us all together, whether we demean the EPA or we support the EPA. It is dollars and cents, whether you are a Democrat or Republican, you save money and that is why the small business people love this. And that is why I am so proud of this hearing.

And I am going to close with a few quotes from this report that really totally contradict what Ms. Smith and Mr. Rowlan said, and

these are all fact-based analyses that you can get when you get this.

And they are also quotes. Here is a great quote. "Clean air, clean water, open spaces, these should once again be the birthright of every American,' Richard Nixon, January 22, 1970 in his State of the Union.

Christie Todd Whitman and Bill Ruckelshaus, Republicans who worked for Republican Administrations at the EPA, they wrote an op-ed together and it said, "It is easy to forget how far we have come in 40 years. We should take heart from all this progress, and not as some have suggested in Congress, seek to tear down the agency that the President and Congress created to protect America's health and environment.'

Gerald Ford said, "Nothing is more essential to the life of every single American than clean air and pure food and safe drinking water.'

And then in the area of job creation and economic growth, I have said before, since the Clean Air Act's implementation, we have grown faster than any other developed country, 207 percent.

And the Clean Air Act is projected to provide $2 trillion in annual health benefits by the year 2020. I defy anyone to come up with anything better than that.

And I am going to give you some more quotes of companies. OK? Companies that aren't here today: PG&E, CalPine Corp., NextEra Energy, Public Service Enterprise Group, National Grid is in this, Excelon, Constellation Energy. Austin Energy in a letter to the editor of The Wall Street Journal in 2010, "Our company's experience complying with air quality regulations demonstrates that regulations can yield important economic benefits, including job creation, while maintaining reliability.' General Motors said just the other day, July 2011, "General Motors Company recognizes the benefit for the Country of continuing the historic national program to address fuel economy and greenhouse gases that the EPA has begun.'

It goes on and on. And because my time is running out, I do want to give you what the American people say about the EPA. And Grant, you found it for me before. Now I have to just take a second. Here it is. Here it is. The American people, and by the way, this is an old poll. It is a few months old. There is a new poll that came out which has even better numbers for the EPA from the people of this Country. The Clean Air Act enjoys broad support from the American people. The public supports stricter limits on air pollution and believes scientific experts should be responsible for setting pollution standards.

And just to back up the numbers, this is a February 2011 bipartisan poll conducted for the American Lung Association: 69 percent of likely voters think EPA should update clean air standards with stricter limits on air pollution. They don't say what Mr. Rowlan said and what Ms. Smith said, or Dr. Smith, excuse me, Dr. Smith, that we should walk away from these regs; 68 percent of the people of this Country feel Congress should not stop the EPA from updating Clean Air Act standards, and yet that is what we are faced with, Mr. Chairman.

They have rolled back three to four to five regs over there in the House, and they think that is going to gain traction. Not only does

it hurt job creation and threaten a $48 billion export industry of clean tech; not only does it threaten 1.7 million jobs and future growth.

And we hear from these folks here who are making money from this; 69 percent believe that EPA scientists, not Congress, should set pollution standards.

So all I can say is I am very familiar with California and I just will close with this, and I am so sorry to do this to you, Mr. Chairman, but you are used to this. The latest report, it is a California report, so you could question it, says that California uses the least amount of energy per capita of any other State in the Nation. And I say that to you, but I do believe our climate would lead us to that. I think you do face a little bit chillier winters and a little bit less sun. We have lots of it there, and more solar energy at this point.

But I did want to put that into the record, subject to your confirmation.

Senator SANDERS. I don't know about that. I don't know if we will put that into the record.

[Laughter.]

Senator SANDERS. But we will continue that discussion.

Senator BOXER. Thank you. I thank all of our witnesses.

Senator SANDERS. OK. Thank you very much.

Senator Boozman.

Senator BOOZMAN. Thank you, Mr. Chairman. And I agree. I think conservation is something that we all agree is very, very important and it is good for business. One of the low-hanging fruits out there is energy-efficient motors, getting rid of some of these old motors; giving incentives to do that; and certainly that is good for your business, Mr. Rowlan, and many other businesses.

On on-bill financing, Mr. White, is there a limit to, if Mr. Rowlan's company wanted to get efficient, is there a limit to the amount of money, how big can the company be to participate? How big can the loan be? Is there a limit? Or how do you do that?

Mr. WHITE. Yes, so specifically to your question or as it relates to our small business program, typically we would give a 70 percent incentive and then the financing would be on the rest of the 30 percent. So it is a proportion of the overall project costs.

Senator BOOZMAN. Up to how many dollars?

Mr. WHITE. I don't have the answer to that question right now. What we see in our different customer types is some of those customers will select, Mr. Rowlan's company would actually work with an ESCO and get better, more attractive holistic projects which it sounds like from their website they are already doing.

So we don't have a specific cap that I am aware of, but our programs are more focused on small businesses and municipalities.

Senator BOOZMAN. No, I think it is a great program, a great idea, and it seems to be very successful.

Are you allowed to add the administrative costs to the program?

Mr. WHITE. Yes. Our energy efficiency programs are State regulated, and the administrative costs associated with those projects are all included in our budgets.

Senator BOOZMAN. Very good.

I appreciate your testimony, Mr. Kempf. I was surprised, really in both of yours, well, all three, that the payback in some cases was

pretty significant and pretty quick. So I think it is a great program and I think it is something that we need to support. I look forward to working to strengthen that.

Mr. White, you have heard the concern from Mr. Rowlan and Dr. Smith. Are you concerned about the impact of the four things? How much does an entity, a lot of natural gas, are you concerned about the increase in electricity cost? Or better yet, are your customers concerned if natural gas does go up 11 percent as predicted?

Mr. WHITE. Yes, so what I would say is interacting with our customers, which is the part of the National Grid that I work with, our customer is always concerned with the rising cost of energy. And the solutions or the tools that we provide are the energy efficiency programs. I can't really speak to the specific items that were addressed by the other panelists.

Senator BOOZMAN. But you have discussed that in meetings and things. Give us, I mean, the reality is if all four of those go into effect, your costs are going to go up significantly. And what percentage are in the on-bill financing program? What percentage of your customers are on the on-bill financing program? Very small, I would suspect.

Mr. WHITE. Well, but it is a growing percentage.

Senator BOOZMAN. But the reality is, if the four did go into effect, the vast majority of your customers would be impacted by an increase in their utility rates.

Mr. WHITE. Yes, I am not familiar with the impacts or the measurements that were discussed here. What I can speak to is sort of the customer facing or customer interaction programs that we have with our energy efficiency programs. The impact of proposed legislation is not really my area of responsibility.

Senator BOOZMAN. OK. But you do deal with customers.

Mr. WHITE. Yes.

Senator BOOZMAN. And if your customers' electricity bill went up significantly, your businesses and your individuals, the single moms, and then it was realized that that was due to these four things going into effect, I doubt that the polling would be very good as far as support for the four things that were put in place.

Mr. WHITE. Yes, again, I can't speak to the polling or the impact of the four things that were mentioned.

Senator BOOZMAN. But in dealing with customers, they would be concerned about the increase.

Mr. WHITE. Yes.

Senator BOOZMAN. And I don't want to beat a dead horse. You understand what I am saying.

Mr. WHITE. I do. Yes.

Senator BOOZMAN. And these are big things. They really are, I know in Arkansas. One of my frustrations is we are losing our manufacturing and it is a huge deal. And we have to as a Nation address how do we do that. But one of the bases of that is certainly reasonably priced energy. And so we do have to figure this thing out where we are able to provide reasonably priced energy, but also to meet the environmental needs that we need to do.

So thank you, Mr. Chairman. I apologize. I have another meeting with a major manufacturer that is scheduled to come up, this meeting with our entire delegation. They are in a situation of needing

some encouragement, and so I am going to sneak out. Senator Sessions is going to be around for a while.

Thank you very much.

Senator SANDERS. Thank you, Senator Boozman.

Senator Sessions.

Senator SESSIONS. Thank you.

Let me just say right up front, I think we have, I don't think, we do have a difference of opinion about green jobs. We just do. We have had an world experiment in Spain. They have been one of the most ambitious countries in the world in trying to create jobs by creating a green energy program. For over a decade, they pursued the policy through green energy. But recent studies have shown that Spain spent over 500,000 euros, $680,000 dollars to create each green job.

Those studies also indicate that Spain lost 2.2 jobs for every green job created. This is because Spain's focus on green energy resulted in substantially higher electricity prices that affected the cost of production.

And Nucor Steel, which has plants in Alabama, they have to compete worldwide. If they have lower energy costs, they are more competitive and can hire more people. If their energy costs are higher, they are less competitive and they can be less successful and hire less people.

In fact, Spain has acknowledged their error and have backed away from much of what they have been doing.

We also have this idea that somehow we can create jobs by reversing the law of markets. Solyndra, $530 million, we are not going to have any more jobs there, it looks like, filed for bankruptcy. You have the plant in Massachusetts that also went belly up that have huge State support, not Federal support; Boston, the Evergreen Solar, $58 million in subsidies and tax breaks and it declared bankruptcy in August of this year.

So Dr. Smith, you have looked at this in the numbers. And we have just got to be honest with each other and try to figure out what the right policy is. I certainly agree with the Chairman and Senator Boozman about conservation, effective techniques and machinery that will help us use less energy. I think that is a win-win when it can be paid for and it makes sense.

So let me ask you, Dr. Smith, your studies show staggering levels of job losses due to the EPA's projected slate of utility coal regulations. A review of your report indicates you actually make several conservative assumptions; that you tend to underestimate the actual losses that might occur. Your analysis, for example, did not take into account increased costs from reduced electricity reliability.

Is it fair to say that the total cost in job losses from the four EPA rules analyzed in your report could actually be greater than you projected?

Ms. SMITH. They could be greater. What I produced is an estimate of the average net loss. And within certain sectors, there is an increase. In other sectors, there is a very large decrease, but that is net within the sector as well.

So if we have a very large decrease, as we do in the retail sector, a surprising place to find the job loss perhaps for some, there could

be even larger losses in there along with some positive increases in the retail sector that the analysis doesn't pick up.

So yes, the actual job losses could be larger. The actual net gains could be larger. I think the important point is that when you look at the balance between gains and losses across the whole economy, it always turns out to look negative, although not always in every sector.

Senator SESSIONS. What kinds of jobs are most likely to be lost in your projections?

Ms. SMITH. Well, the vast majority of the jobs lost, as I said, are in the retail sector and a great number of other sectors that support the economy and the supply chain generally. They all suffer as the reduction in economic activity occurs in their overall demand.

So none of them are among the set that are directly affected by the rules. At the same time, it is true that the mining sector does face some negative losses. On the other hand, the gas sector goes positive because of the increased demand for gas. The sectors where we see the positive jobs are construction and machinery manufacturing, as you would expect from a large program of spending on environmental controls or building new powerplants.

Senator SESSIONS. Which would be short term.

Ms. SMITH. But the negatives are not in the energy sector entirely. The vast majority are across the whole economy.

Senator SESSIONS. And what kind? Manufacturing?

Ms. SMITH. Manufacturing, except for those parts of the manufacturing that are supplying the equipment to build the powerplants for the environmental controls.

Senator SESSIONS. Because the energy costs can adversely affect manufacturing?

Ms. SMITH. They certainly do. And we see actually a reduction in demand for electricity in the policy scenario, compared to not having those policies being implemented. And that is from the manufacturing being reduced overall across the economy.

Senator SESSIONS. Mr. Rowlan, with regard to a steel company like Nucor, would you explain to us how energy prices can impact your viability, your growth, and your job and hiring policies?

Mr. ROWLAN. Yes, well, that was in my testimony there. Just a simple one cent increase per kilowatt hour for us is a cost well in excess of $120 million a year. And really, if you sit and look at some of the things that have been said, that $120 million has to come from someplace because we can't just increase the price of the commodity that we are selling because we are competing internationally.

So the projects like the good Senator referenced, which is the Calstrip project which was energy efficient, which is research we put money into, there is $120-plus million a year, we can't put money into that. We are happy to pursue energy efficiency projects. We pursue them, and that is how we have driven our numbers down and that is how we have become competitive.

The irony in this is that we say raise prices and somehow we are going to create jobs, or raise taxes and we will create jobs. You know, you raise prices, people buy less. That is what happens. And

you don't do that. It goes exactly the opposite direction. It flies in the face of reality.

Senator SESSIONS. I know the Chairman and I agreed with your CEO's views about the China currency, and you give our foreign competitors an additional advantage. You have wages. You have currency. Now with China a major steel producer, and then if you give an energy advantage, I think that you would agree that would be further damage to the competitiveness.

Mr. ROWLAN. Yes, currency is a big issue. You know, these things manifest themselves in a lot of ways. I heard that the energy consumption in California, I think, was the lowest per capita. Well, if industry left and you were dividing all of that energy being gone now, you basically left the denominator where it was at. You are going to see that happen. If industry leaves, the energy consumption per capita in that State will go down significantly. That would be something I would expect to see predicted by Dr. Smith.

Senator SESSIONS. Thank you, Mr. Chairman.

We disagree on some things here, but the Chairman is sincerely committed to making us a healthy and more viable place, and I am, too. And let's keep working.

Senator SANDERS. Yes, we will. Thank you very much, Senator Sessions.

It appears that some members of the panel were coming from different directions than other members, maybe some confusion as to what the topic of discussion was today. I didn't hear Dr. Smith or Mr. Rowlan talk about on-bill financing, which is in fact what the subject of this panel was today.

But I would hope, Senator Sessions, and all members of the panel, that we pursue this issue of on-bill financing. I know you missed the first part of the meeting, Jeff, where we think we have real potential to provide capital to small businesses, municipalities, homeowners to help them make the innovations and the efficiencies that they need to substantially lower their energy bills and cut pollution and greenhouse gas emissions.

And we have heard testimony that in some cases, the payback could be a year or two. And yet we are sitting on a situation where millions of homeowners don't have that initial $10,000, $20,000 to make the changes.

So I look forward to working with you to see how we can have the government play a positive role in working with utilities around the Country, small businesses, homeowners, to get that capital available, to expedite the process.

So with that, yes?

Senator SESSIONS. I recently had to replace an air conditioning unit and I found it difficult to, even with the requirements we have on energy efficiency, it was more difficult than I imagined to figure out what the best payback would be; what the best investment would be. And I felt like that if we are going to have regulations to do this, somehow it needs to be a little clearer still.

Senator SANDERS. Well, I think that is exactly what Mr. White and others have been talking about. And my guess is that, Mr. White, you are helping businesses put in new heating and cooling systems. Yes?

Mr. WHITE. Yes, that is correct. So we are fortunate to have programs in four States up in the Northeast, and we help customers, both residential customers and commercial customers, and kind of walk them through the process so they can have the ability to make informed decisions, because it can get confusing. There is no doubt about that.

Senator SESSIONS. I believe we can do better, and I thank you for raising that issue. I do believe that is a win-win.

Senator SANDERS. Yes, it is.

Senator SESSIONS. If you can make the changes in your heating and cooling and other energy uses that will likely pay for themselves over a period of years. It is a win-win for us, I think.

Senator SANDERS. So let's work on that together, and thank you.

And I thank all the panelists for being here.

Oh, Senator Whitehouse, didn't see him.

Senator Whitehouse.

Senator WHITEHOUSE. I snuck back in. We had a Judiciary markup, but I did want to return, and I won't hold the hearing long, but I would love to ask Mr. White what the forecast is for the on-bill financing and what specifically we can do to help National Grid and other companies who will be following your lead to take advantage of this mechanism.

Is it access to capital? Is it notice to ratepayers? What are the hold-backs that have kept this from spreading further? And how are you going to work your way through them? And what do you think the ultimate reach of the program should be?

Mr. WHITE. Yes, great question and thank you for that.

And one of the things that I would like to say is Rhode Island specifically is increasing the amount of energy efficiency programs they are making available to customers, and very much competing with Vermont and California and Massachusetts and others. So I respectfully add that to the record, which is great.

Senator WHITEHOUSE. Take that, Vermont.

[Laughter.]

Mr. WHITE. What excites me the most about the opportunity to work with enhancing some of the solutions on on-bill financing is the fact that in some States there is reluctance to move forward for a whole host of issues. So to the degree that we can actually come up with something both federally that complements the State programs, I think is going to be a win-win for everyone.

I don't know specifically what the mechanism will or should be. There are a lot smarter people out there that can figure that out with us all. But I think from a customer's perspective, which was one of the questions I received earlier, on-bill repayment, on-bill financing is just another way. It is another tool to help enhance the use of these programs. And I look forward to working with the Committee and all those involved.

Senator WHITEHOUSE. Are you using your own capital to fund it, as well as third-party capital?

Mr. WHITE. Yes. It is a combination of both. So we actually have some requirements at some of our State programs to go out and find outside capital, which have proved to be a challenge during these economic times to get capital at the competitive rates that are needed.

So in some cases, we are using the system benefit charge moneys that we collect in offering the on-bill financing to those customers, and our default rates have been very low, which has been very encouraging.

Senator WHITEHOUSE. As low as zero percent in certain customer classes. Correct?

Mr. WHITE. Well, zero percent for the financing, but the default rate is also very low, 2 percent, 1 percent in some areas. So it has been a very useful tool, very useful mechanism.

Senator WHITEHOUSE. Very good.

Thank you, Chairman. It has been a great hearing.

Senator SANDERS. OK. Thank you all very much for being here. I appreciate it.

The meeting is now adjourned.

[Whereupon, at 11:25 a.m., the subcommittee was adjourned.]

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